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Report on the technical review of the seventh national communication of the Netherlands

Parties included in Annex I to the Convention were requested by decision 9/CP.16 to submit their seventh national communication to the secretariat by 1 January 2018. According to decision 15/CMP.1, Parties included in Annex I to the Convention that are also Parties to the Kyoto Protocol are required to include in their national communications supplementary information under Article 7, paragraph 2, of the Kyoto Protocol. This report presents the results of the technical review of the seventh national communication and relevant supplementary information under the Kyoto Protocol of the Netherlands, conducted by an expert review team in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention" and the "Guidelines for review under Article 8 of the Kyoto Protocol".

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Abbreviations and acronyms

AEA	annual emission allocation
BR	biennial report
CDM	clean development mechanism
CH_4	methane
CO_2	carbon dioxide
CO_2 eq	carbon dioxide equivalent
CTF	common tabular format
ERT	expert review team
ESD	effort-sharing decision
EU	European Union
EU ETS	European Union Emissions Trading System
F-gas	fluorinated gas
GCOS	Global Climate Observing System
GDP	gross domestic product
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
IE	included elsewhere
IPCC	Intergovernmental Panel on Climate Change
IPPU	industrial processes and product use
LULUCF	land use, land-use change and forestry
NA	not applicable
NC	national communication
NEV 2017	National Energy Outlook 2017
NF_3	nitrogen trifluoride
NGO	non-governmental organization
NIR	national inventory report
NO	not occurring
non-Annex I Party	Party not included in Annex I to the Convention
non-ETS sectors	sectors not covered by the European Union Emissions Trading System
N_2O	nitrous oxide
ODA	official development assistance
PaMs	policies and measures
PFC	perfluorocarbon
reporting guidelines for supplementary information	"Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol, Part II: Reporting of supplementary information under Article 7, paragraph 2"
SDE+	Stimulation for Sustainable Energy Production
SF_6	sulfur hexafluoride
UNFCCC reporting guidelines on NCs	"Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part II: UNFCCC reporting guidelines on national communications"
WAM	'with additional measures'
WEM	'with measures'
WOM	'without measures'
2006 IPCC Guidelines	*2006 IPCC Guidelines for National Greenhouse Gas Inventories*

I. Introduction and summary

A. Introduction

1. This is a report on the in-country technical review of the NC7 of the Netherlands. The review was coordinated by the secretariat in accordance with the "Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention", particularly "Part V: UNFCCC guidelines for the technical review of national communications from Parties included in Annex I to the Convention" (annex to decision 13/CP.20), and the "Guidelines for review under Article 8 of the Kyoto Protocol" (annex to decision 22/CMP.1 and annex I to decision 4/CMP.11).[1]

2. In accordance with the same decisions, a draft version of this report was transmitted to the Government of the Netherlands, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

3. The review was conducted from 5 to 10 March 2018 in The Hague by the following team of nominated experts from the UNFCCC roster of experts: Ms. Buket Akay (Turkey), Ms. Irina Atamuradova (Turkmenistan), Mr. Jozsef Feiler (Hungary), Ms. Olia Glade (New Zealand) and Mr. Mahendra Kumar (Fiji). Ms. Glade and Mr. Kumar were the lead reviewers. The review was coordinated by Ms. Inkar Kadyrzhanova (UNFCCC secretariat).

B. Summary

4. The ERT conducted a technical review of the information reported in the NC7 of the Netherlands in accordance with the UNFCCC reporting guidelines on NCs (decision 4/CP.5) and the reporting guidelines for supplementary information, in particular the supplementary information required under Article 7, paragraph 2, and on the minimization of adverse impacts under Article 3, paragraph 14, of the Kyoto Protocol (annex to decision 15/CMP.1 and annex III to decision 3/CMP.11).

1. Timeliness

5. The NC7 was submitted on 29 December 2017, before the deadline of 1 January 2018 mandated by decision 9/CP.16. The Netherlands resubmitted its NC7 on 14 February 2018.

2. Completeness, transparency of reporting and adherence to the reporting guidelines

6. Issues and gaps identified by the ERT related to the reported information are presented in table 1. The information reported by the Netherlands in its NC7, including the supplementary information under the Kyoto Protocol, mostly adheres to the UNFCCC reporting guidelines on NCs.

[1] At the time of the publication of this report, the Party had submitted its instrument of acceptance of the Doha Amendment; however, the amendment had not yet entered into force. The implementation of the provisions of the Doha Amendment is therefore considered in this report in the context of decision 1/CMP.8, paragraph 6, pending the entry into force of the amendment.

Table 1

Assessment of completeness and transparency of mandatory information reported by the Netherlands in its seventh national communication, including supplementary information under the Kyoto Protocol

Section of NC	*Completeness*	*Transparency*	*Reference to description of recommendations*	*Supplementary information under the Kyoto Protocol*	*Completeness*	*Transparency*	*Reference to description of recommendations*
Executive summary	Complete	Transparent		National system	Complete	Transparent	
National circumstances	Complete	Transparent		National registry	Complete	Transparent	
GHG inventory	Complete	Transparent		Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	Complete	Mostly transparent	Issue 1 in table 16
PaMs	Complete	Transparent		PaMs in accordance with Article 2	Mostly complete	Transparent	Issue 3 in table 9
Projections and the total effect of PaMs	Complete	Mostly transparent	Issue 2 in table 13	Domestic and regional programmes and/or arrangements and procedures	Mostly complete	Transparent	Issue 1 in table 7
Vulnerability assessment, climate change impacts and adaptation measures	Complete	Transparent		Information under Article 10[a]	Complete	Transparent	
Financial resources and transfer of technology	Mostly complete	Mostly transparent	Issue 1 in table 18 and issue 2 in table 19	Financial resources	Mostly complete	Transparent	Issue 3 in table 18
Research and systematic observation	Complete	Mostly transparent	Issue 1 in table 21	Minimization of adverse impacts in accordance with Article 3, paragraph 14	Complete	Transparent	
Education, training and public awareness	Complete	Transparent					

Note: A list of recommendations pertaining to the completeness and transparency issues identified in this table is included in chapter III below.

[a] The assessment refers to information provided by the Party on the provisions contained in Article 4, paragraphs 3, 5 and 7, of the Convention reported under Article 10 of the Kyoto Protocol, which is relevant only to Parties included in Annex II to the Convention. Assessment of the information provided by the Party on the other provisions of Article 10 of the Kyoto Protocol is provided under the relevant substantive headings under the Convention, for example research and systematic observation.

3. Summary of reviewed supplementary information under the Kyoto Protocol

7. The supplementary information under Article 7, paragraph 2, of the Kyoto Protocol is incorporated in different sections of the NC7, and the supplementary information under Article 7, paragraph 1, of the Kyoto Protocol is reported in the NIR of the 2017 annual submission. Table 2 provides references to where the information is reported. The technical assessment of the information reported under Article 7, paragraphs 1 and 2, of the Kyoto Protocol is contained in the relevant sections of this report.

Table 2
Overview of supplementary information under the Kyoto Protocol reported by the Netherlands

Supplementary information	*Reference to section of the NC7*
National registry	3.4
National system	3.3
Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17	5.6
PaMs in accordance with Article 2	4.3
Domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures	4.3
Information under Article 10	3.4, 4.3, 6.3, 7.4, 8, 8.3, 9
Financial resources	7.2, 7.5
Minimization of adverse impacts in accordance with Article 3, paragraph 14	Reported in the NIR of the Party's 2017 annual submission

II. Technical review of the information reported in the seventh national communication, including the supplementary information under the Kyoto Protocol

A. Information on national circumstances and greenhouse gas emissions and removals

1. National circumstances relevant to greenhouse gas emissions and removals

(a) Technical assessment of the reported information

8. The national circumstances of the Netherlands explain the relationship between its historical and future emission trends and the climate change policy agenda. The changing nature of those circumstances defines the factors that affect the climate policy development and implementation of the Convention. The NC7 contains key data on legislation, population trends, geography and land use, climate and climate change, economic developments, energy, transport, the buildings sector, industry, trade, the services sector, agriculture, forestry, resource efficiency and wastewater.

9. In terms of changes since the previous submission, it is important to highlight that the responsibility for climate policy shifted from the Ministry of Infrastructure and the Environment to the Ministry of Economic Affairs and Climate Policy in 2017. Other ministries remained responsible for integrating environmental policy targets and endorsing the environmental policies in their respective fields (see para. 35 below).

10. The critical driver of GHG emissions is population and its growth rate in the Netherlands, where the population growth rate decreased from 0.8 per cent in the 1990s to 0.15 per cent in 2006 and is projected to reach zero by 2045. The population density increased between 1990 and 2017 from 439 to 507 persons per km^2. Another important

demographic factor influencing the pressure on the environment is the decrease in the number of persons per household (from 2.5 in 1990 to 2.2 in 2017).

11. During the period 1990–2015, total energy consumption in the Netherlands increased by 12 per cent, reaching a maximum of 3,485 PJ in 2010 (owing to the increased national gas consumption during the cold winter period). Total energy consumption has fallen sharply since 2010, primarily as a result of a steep drop in natural gas consumption, caused mainly by milder winters. In 2016, total energy consumption decreased to 3,155 PJ.

12. More than 90 per cent of energy consumption is from fossil fuels, including natural gas and oil products, in the Netherlands, which relies on domestic natural gas for electricity generation. The contribution of coal increased by more than a third between 1990 and 2015 because of the commissioning of three new coal-fired power plants in 2013–2015. The share of renewable energy has gradually risen, starting from 1.6 per cent in 2010 to reach 6.0 per cent in 2016 (125 PJ), as a result of government subsidies for electricity production and the obligatory use of biofuels in transport. The Party has achieved a remarkable increase in the share of renewables in total energy consumption because of the increase in solar projects in 2014 and the opening of an offshore wind farm in 2016.

13. The ERT noted that during the period 1990–2015 the Netherlands' population and GDP increased by 13.3 and 63.7 per cent, respectively, while GHG emissions per GDP unit and GHG emissions per capita decreased by 46.0 and 22.0 per cent, respectively. This indicates that the Netherlands has made significant progress in decoupling GHG emissions from economic growth, thanks to measures taken under the long-term agreements on energy efficiency. Table 3 illustrates the national circumstances of the Netherlands by providing some indicators relevant to emissions and removals.

Table 3
Indicators relevant to greenhouse gas emissions and removals for the Netherlands for the period 1990–2015

	Year					*Change (%)*	
Indicator	*1990*	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*
GDP per capita (thousands 2011 USD using purchasing power parity)	32.09	41.72	45.52	45.67	46.35	44.4	1.5
GHG emissions without LULUCF per capita (t CO_2 eq)	14.76	13.78	12.87	11.11	11.51	–22.0	3.6
GHG emissions without LULUCF per GDP unit (kg CO_2 eq per 2011 USD using purchasing power parity)	0.46	0.33	0.28	0.24	0.25	–46.0	2.1

Sources: (1) GHG emission data: the Netherlands' 2017 GHG inventory submission, version 5; (2) population and GDP: World Bank.

Note: The ratios per capita and per GDP unit are calculated relative to GHG emissions without LULUCF; the ratios are calculated using the exact (not rounded) values and may therefore differ from a ratio calculated with the rounded numbers provided in the table.

(b) Assessment of adherence to the reporting guidelines

14. The ERT assessed the information reported in the NC7 of the Netherlands and identified an issue relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 4.

Table 4
Findings on national circumstances relevant to greenhouse gas emissions and removals from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 8 Issue type: transparency Assessment: encouragement	The information on commercial buildings, frequency of extreme climate events and economic parameters (e.g. GDP in current prices, GDP per capita and the resource base of primary energy sources) is not included in the chapter on national circumstances. During the review, in response to the questions raised by the ERT, the Netherlands provided additional information on national circumstances that included the description of the structure and energy efficiency of the commercial buildings sector, information on GDP in current prices, GDP per capita, the resource base of primary energy sources and extreme climatic events. To improve transparency, the ERT encourages the Netherlands to include the description of the overall buildings sector disaggregated by subsector, such as residential and commercial buildings, and the analysis of the frequency of extreme climatic events in its next NC. In addition, the ERT notes that the Netherlands addressed the encouragements made in the previous review report by providing additional information on the transport sector in the chapter on national circumstances in the NC7.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

2. Information on greenhouse gas inventory arrangements, emissions, removals and trends

(a) Technical assessment of the reported information

15. Total GHG emissions[2] excluding emissions and removals from LULUCF decreased by 11.6 per cent between 1990 and 2015, whereas total GHG emissions including net emissions or removals from LULUCF decreased by 11.0 per cent over the same period. According to the 2018 GHG inventory submission presented by the Netherlands during the review, total GHG emissions excluding LULUCF in 2016 had increased by around 1.0 per cent compared with 2015. Table 5 illustrates the emission trends by sector and by gas for the Netherlands.

Table 5
Greenhouse gas emissions by sector and by gas for the Netherlands for the period 1990–2015

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*	*1990*	*2015*
Sector									
1. Energy	156 404.87	165 903.27	178 772.85	154 177.49	160 967.83	2.9	4.4	70.9	82.5
A1. Energy industries	53 075.52	64 323.06	66 677.83	63 977.07	68 357.61	28.8	6.8	24.0	35.0
A2. Manufacturing industries and construction	32 123.55	26 879.82	27 161.72	24 313.32	24 129.87	–24.9	–0.8	14.6	12.4
A3. Transport	28 139.98	33 076.25	35 381.65	30 677.90	31 159.83	10.7	1.6	12.7	16.0
A4. and A5. Other	39 945.42	39 999.34	46 683.99	32 844.85	34 545.06	–13.5	5.2	18.1	17.7
B. Fugitive emissions	3 120.40	1 624.80	2 867.67	2 364.35	2 775.46	–11.1	17.4	1.4	1.4

[2] In this report, the term "total GHG emissions" refers to the aggregated national GHG emissions expressed in terms of CO_2 eq excluding LULUCF, unless otherwise specified. Values in this paragraph are calculated based on the 2017 annual submission, version 5.

	GHG emissions (kt CO_2 eq)					*Change (%)*		*Share (%)*	
	1990	*2000*	*2010*	*2014*	*2015*	*1990–2015*	*2014–2015*	*1990*	*2015*
from fuels									
C. CO_2 transport and storage	NO	NO	NO	NO	NO	NA	NA	NA	NA
2. IPPU	24 850.90	22 409.51	12 145.26	11 000.55	11 482.49	–53.8	4.4	11.3	5.9
3. Agriculture	25 314.77	21 243.78	18 495.31	18 616.70	19 210.26	–24.1	3.2	11.5	9.8
4. LULUCF	6 060.44	6 044.51	6 135.20	6 674.89	6 710.87	10.7	0.5	NA	NA
5. Waste	14 180.20	9 821.84	4 508.20	3 578.04	3 378.06	–76.2	–5.6	6.4	1.7
6. Other	NO	NO	NO	NO	NO	NA	NA	NA	NA
Indirect CO_2	665.96	335.77	236.55	209.62	207.04	–68.9	–1.2	NA	NA
Gas									
CO_2	162 271.29	171 650.16	182 545.60	158 043.01	165 127.23	1.8	4.5	73.5	84.7
CH_4	32 316.45	25 090.46	20 116.21	18 784.43	19 000.75	–41.2	1.2	14.6	9.7
N_2O	17 687.11	15 711.14	8 125.93	8 065.33	8 331.87	–52.9	3.3	8.0	4.3
HFCs	5 606.33	4 765.06	2 666.32	2 252.21	2 335.72	–58.3	3.7	2.5	1.2
PFCs	2 662.85	1 902.81	313.77	93.21	104.22	–96.1	11.8	1.2	0.1
SF_6	206.70	258.78	153.79	134.59	138.83	–32.8	3.2	0.1	0.1
NF_3	NO, IE	NO, IE	NO, IE	NO, IE	NO, IE	NA	NA	NA	NA
Total GHG emissions without LULUCF	**220 750.73**	**219 378.41**	**213 921.63**	**187 372.78**	**195 038.63**	**–11.6**	**4.1**	**100.0**	**100.0**
Total GHG emissions with LULUCF	**226 811.17**	**225 422.92**	**220 056.82**	**194 047.67**	**201 749.50**	**–11.0**	**4.0**	**NA**	**NA**
Total GHG emissions without LULUCF, including indirect CO_2	**221 416.70**	**219 714.18**	**214 158.17**	**187 582.41**	**195 245.67**	**–11.8**	**4.1**	**NA**	**NA**
Total GHG emissions with LULUCF, including indirect CO_2	**227 477.14**	**225 758.69**	**220 293.37**	**194 257.30**	**201 956.54**	**–11.2**	**4.0**	**NA**	**NA**

Source: GHG emission data: the Netherlands' 2017 annual submission, version 5.

16. The decrease in total GHG emissions was due mainly to the decrease in emissions from the IPPU, agriculture and waste sectors, driven by the decrease in CH_4, N_2O and F-gases (by 41.2, 52.9 and 69.6 per cent, respectively) and the notable decrease in emissions from energy use in non-energy industries (by 24.9 per cent).

17. CO_2 emissions from the built environment decreased by 15.5 per cent, despite a 13 per cent increase in the number of households and a 25 per cent increase in the floor area of utility buildings, during the period 2000–2016. CO_2 emissions from other industries decreased by almost 20 per cent owing to declining energy demand after 2008 due to the economic crisis and improved energy efficiency. CO_2 emissions from the agriculture sector have fallen by more than 19 per cent, following the trends of declining cultivation area and energy consumption for greenhouse horticulture.

18. Between 1990 and 2015, GHG emissions from the energy sector increased by 2.9 per cent (4,562.9 kt CO_2 eq), owing mainly to the developments in the energy sector, where the use of coal for electricity production has increased. The trend in GHG emissions from fuel combustion showed notable increases in the transport sector (10.7 per cent or 3,019.85 kt CO_2 eq) and energy use in energy industries (28.8 per cent or 15,282.09 kt CO_2 eq).

19. The energy sector is by far the largest contributor to the total GHG emissions in the national inventory (its share was 82.5 per cent in 2015). The emission growth in the energy sector is due mainly to three new coal-fired power plants being commissioned between

2013 and 2015, which led to an increase in the use of coal by more than a third. The emissions from transport peaked in 2010 and have been falling since 2012, partly because of weaker growth in traffic, a more economical vehicle fleet under the influence of the European standards for CO_2 and the tax incentives to boost the fuel economy of vehicles. However, emissions from the transport sector in 2015 were still 10.7 per cent higher than they were in 1990.

20. Between 1990 and 2015, GHG emissions from the IPPU sector sharply decreased by 53.8 per cent (13,368.41 kt CO_2 eq), owing mainly to decreasing N_2O emissions from the industries producing caprolactam and a reduction in nitric acid because of technical measures to reduce emissions undertaken at the nitric acid factories in 2007. Between 1990 and 2015, GHG emissions from the agriculture sector decreased by 24.1 per cent (6,104.51 kt CO_2 eq), owing mainly to decreasing CH_4 emissions from enteric fermentation and manure management, N_2O emissions from manure management and direct and indirect emissions from agricultural soils. The CH_4 emission trend was driven by the decrease in the number of livestock in agriculture. N_2O emissions decreased mainly because of a reduction in the amount of manure applied to land and a reduction in fertilizer use.

21. The LULUCF sector was a net source of 6,710.87 kt CO_2 eq in the Netherlands in 2015; net GHG emissions have increased by 650.43 kt CO_2 eq since 1990. The trend was mainly driven by the emission sources grasslands (on peatland), croplands and soils in the built environment. Forests are a net sink of CO_2. Emissions from grasslands have been declining as a result of their conversion into croplands as well as the establishment of new infrastructure and buildings, both of which resulted in a net release of CO_2 from soils. Between 1990 and 2015, GHG emissions from the waste sector decreased by 76.2 per cent (10,802.14 kt CO_2 eq), owing mainly to substantially falling CH_4 emissions from waste disposal on landfill sites.

22. In the period 1990–2015, emissions of CO_2 increased by 1.8 per cent (excluding LULUCF). Emissions of non-CO_2 GHGs (i.e. CH_4, N_2O and F-gases) decreased by 41.2, 52.9 and 69.6 per cent, respectively. This growth is due mainly to developments in the energy sector, where the use of coal for power production has been increasing. Relatively high levels of CO_2 emissions in certain years, for instance in 2010, can be explained mainly by the relatively cold winters, which led to increased energy use for space heating in the residential sector. Indirect CO_2 emissions (calculated from the oxidation of emissions of non-methane volatile organic compounds from solvents) are only a minor source in the Netherlands (207.04 Mt CO_2 eq in 2015).

23. The agriculture and waste sectors were the largest contributors of CH_4, emitting 67.0 and 18.0 per cent of the total, respectively, in 2015. The IPPU sector contributed the most to the decrease in N_2O emissions (which were almost 81.0 per cent lower in 2015 than in the base year). Emissions from the use of F-gases, however, increased between 1990 and 2015 from 0.2 to 2.4 Mt CO_2 eq, owing mainly to the large growth in the use of HFCs because of the phasing out of ozone-depleting substances (especially hydrochlorofluorocarbons) since 1995.

24. The summary information provided on GHG emissions was consistent with the information reported in the 2017 annual submission.

(b) Assessment of adherence to the reporting guidelines

25. The ERT assessed the information reported in the NC7 of the Netherlands and identified an issue relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 6.

Table 6
Findings on greenhouse gas inventory information from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 12 Issue type: transparency Assessment: encouragement	During the review, the Netherlands presented information on the relationship between its emission trends and economic development in the form of a diagram showing the decoupling of GDP growth from the change in GHG emissions. The ERT welcomes this helpful information and, to further enhance transparency, encourages the Netherlands to include emission intensity indicators, such as the total CO_2 intensity per GDP unit or per capita, in its next NC, in order to provide the reader with a better understanding of emission trends and drivers.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

3. National system for the estimation of anthropogenic emissions by sources and removals by sinks

(a) Technical assessment of the reported information

26. The Netherlands provided in the NC7 a description of how its national system for the estimation of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol is performing the general and specific functions defined in the annex to decision 19/CMP.1. The description includes all the elements mandated by paragraph 30 of the annex to decision 15/CMP.1. The NC7 also contains a reference to the description of the national system provided in the report mandated by decision 2/CMP.8, submitted in the NIR of the 2017 annual submission. The ERT noted that responsibility for climate change policy has been transferred to the Ministry of Economic Affairs and Climate Policy. However, the changes do not influence the functioning of the national system.

27. The single national entity responsible for the national GHG inventory and the roles and responsibilities of various agencies and entities involved have remained unchanged since the NC6. The ERT took note of the review of the changes to the national system reflected in the report on the individual review of the 2016 annual submission of the Netherlands.

28. During the review, the Netherlands provided additional information on the changes to its national system. The Party replaced 40 monitoring protocols used for estimating emissions, containing the methodological descriptions, activity data and emission factors, as part of the national system, with five methodology reports.

(b) Assessment of adherence to the reporting guidelines

29. The ERT assessed the information reported in the NC7 of the Netherlands and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

4. National registry

(a) Technical assessment of the reported information

30. In the NC7 the Netherlands provided information on how its national registry performs the functions in accordance with the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1 and complies with the requirements of the technical standards for data exchange between registry systems. The ERT took note of the review of the changes to the national registry reflected in the report on the individual review of the 2016 annual submission of the Netherlands.

(b) Assessment of adherence to the reporting guidelines

31. The ERT assessed the information reported in the NC7 of the Netherlands and recognized that the reporting is complete and transparent. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

B. Information on policies and measures and institutional arrangements

1. Domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol

(a) Technical assessment of the reported information

32. For the second commitment period of the Kyoto Protocol, from 2013 to 2020, the Netherlands committed to contributing to the joint EU effort to reduce GHG emissions by 20 per cent below the base-year level. As an EU member State, the Netherlands is subject to EU climate policy and so it applies the EU common and coordinated policies and measures relevant to climate change, including the EU directive on the European system for CO_2 emissions trading (directive 2003/87/EC) and the ESD (decision 406/2009/EC).

33. The common and coordinated policies and measures also include the burden-sharing agreement of the EU for meeting the commitments under the Kyoto Protocol (decision 2002/358/EC) and the EU monitoring mechanism regulation, which ensures that the EU's progress towards meeting its Kyoto Protocol target is assessed annually and that member States provide sufficient information to the EU. Other common and coordinated policies and measures relate to the promotion of renewable energy, the introduction of biofuels for transport, the stimulation of energy savings and the reduction of CH_4 emissions from landfill waste sites (see para. 51 below).

34. The implementation of the Kyoto Protocol by the Netherlands is underpinned by the Environmental Management Act, which sets out an integrated approach to environmental management and provides a legal framework by defining the roles of national, provincial or regional, and municipal governments. The Environmental Management Act therefore provides the legal basis for most environmental regulations that affect the emission of GHGs (e.g. regarding waste prevention, landfill policy and CO_2 emissions trading). It states which authorities are responsible for enforcement and requires them to designate officials who are charged with monitoring compliance. In the event of violations, authorities have several sanctions at their disposal. The Act also provides the framework for enforcing commitments undertaken under the long-term agreements on energy efficiency in the Netherlands.

35. The overall responsibility for climate change policymaking lies with the Ministry of Economic Affairs and Climate Policy, and a number of national institutions are involved in the implementation of the policy: the Ministry of Infrastructure and Water Management is responsible for spatial aspects of energy transition, monitoring industrial emissions, circular economy, transport emissions and climate adaptation; the Ministry of the Interior and Kingdom Relations is responsible for energy efficiency in the built environment and sustainable public procurement; the Ministry of Foreign Affairs is responsible for financial, technological and capacity-building support provision to developing countries; and the Ministry of Agriculture is responsible for agriculture and land use.

36. During the review, the Netherlands explained that the institutional arrangements that had been set up previously in order to administer emission credits are no longer in place because it is no longer its policy to acquire emission credits. However, the Government continues to facilitate the participation of other legal entities in CDM projects by providing the necessary letter of approval if certain requirements are met.

37. The Netherlands has legislative arrangements and administrative procedures in place to make information publicly accessible, such as the Freedom of Information Act and the Environmental Management Act, which provide public access to information on the enforcement of environmental rules and regulations. After adoption, all laws and

underlying legislative arrangements in the Netherlands are published in one of several official government bulletins and/or directly on the website of the national system.[3]

38. The Netherlands has national legislative arrangements and administrative procedures in place that seek to ensure that the implementation of activities under Article 3, paragraph 3, forest management under Article 3, paragraph 4, and any elected activities under Article 3, paragraph 4, of the Kyoto Protocol also contributes to the conservation of biodiversity and the sustainable use of natural resources. As reported in the NC7, over the past decades forest policy in the Netherlands has been integrated into the nature policy, which reflects the shift towards multipurpose forests in which more functions are combined (e.g. nature, recreation). The development of a nature network is a central theme of the nature (and forest) policy. Implementation of the nature policy, including the development of the nature network, has been decentralized from the central Government to the provincial governments.

39. During the review, the ERT took note that, since 1 January 2017, the Forest Act, the Nature Protection Act (1998) and the Flora and Fauna Act have been replaced by one new Nature Protection Act, whereby the regional authorities (provinces) became responsible for the regulation of the forest and nature areas and so these are no longer the responsibility of the national authority.

(b) Assessment of adherence to the reporting guidelines

40. The ERT assessed the information reported in the NC7 of the Netherlands and identified issues relating to completeness and transparency. The findings are described in table 7.

Table 7
Findings on domestic and regional programmes and/or legislative arrangements and procedures related to the Kyoto Protocol from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraph 37	The NC7 contains incomplete information on the institutional arrangements and decision-making procedures in place to coordinate activities relating to the Netherlands' participation in the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol. The ERT noted that this information was included in the NC6 as a separate section.
	Issue type: completeness Assessment: recommendation	During the review, the Netherlands explained that, although the institutional arrangements that had previously been set up to administer emission credits are no longer in place, the Dutch Emissions Authority is still the institution that keeps the national registry for emission credits from Kyoto Protocol mechanisms as well as for emission allowances from the EU ETS and ESD (non-ETS). The Dutch Emissions Authority has an executive board that acts as a non-departmental public body responsible for maintaining the Dutch part of the Kyoto Protocol registry. Effective 1 January 2013, the Dutch Emissions Authority is the designated national authority that issues letters of approval for CDM projects to other legal entities. The ERT recommends that in the next NC the Netherlands include information on institutional arrangements and decision-making procedures in place to coordinate activities relating to the Party's participation in the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol.
2	Reporting requirement specified in paragraph 38	The NC7 does not include a reference to the information relevant to the national legislative arrangements and administrative procedures in place to ensure that the implementation of activities under Article 3, paragraphs 3 and 4, of the Kyoto Protocol contributes to the conservation of biodiversity and sustainable use of nature resources. The ERT noted that the NC6 contained this information in a separate section.
	Issue type: transparency	During the review, the Netherlands pointed out that section 4.3 (policies and measures and their effects) of its NC7 includes relevant information.

[3] http://english.rvo.nl/nic.

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
	Assessment: encouragement	The ERT encourages the Netherlands to place the information relevant to paragraph 38 of the UNFCCC reporting guidelines on NCs in a separate section of its next NC, as was done in the NC6, to improve transparency and the user-friendliness of the report.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent.

2. Policies and measures, including those in accordance with Article 2 of the Kyoto Protocol

(a) Technical assessment of the reported information

41. The Netherlands provided information on its package of PaMs implemented, adopted and planned, by sector and by gas, in order to fulfil its commitments under the Convention and its Kyoto Protocol. The Party reported on its policy context and legal and institutional arrangements put in place to implement its commitments and monitor and evaluate the effectiveness of its PaMs.

42. The Netherlands provided information on a set of PaMs similar to those previously reported. It also provided information on changes made since the previous submission to its institutional, legal, administrative and procedural arrangements used for domestic compliance, monitoring, reporting, archiving of information and evaluation of the progress made towards its target. During the review, the Netherlands provided a detailed update on these arrangements.

43. The overall responsibility for climate change policymaking lies with the Ministry of Economic Affairs and Climate Policy. The Party informed the ERT that the institutional cooperation framework on climate policy implementation led by the Ministry of Economic Affairs and Climate Policy changed in 2017, but the change does not influence the functions provided by the cooperating institutions (see para. 35 above).

44. The Netherlands gave priority to implementing the PaMs that make the most significant contribution to its emission reduction efforts. The Party provided information on how it believes its PaMs are modifying longer-term trends in anthropogenic GHG emissions and removals in accordance with the objective of the Convention. It reported on how it periodically updates its PaMs to reduce greater levels of emissions and on the PaMs that have been discontinued since the previous submission.

45. The main cross-sectoral and overarching policy framework in the Netherlands is the Agreement on Energy for Sustainable Growth (2013). Its horizontal focus encompasses measures on both the supply and the demand side of the energy sector. The framework provides consistency and stability of the energy policy, supported by a wide social alliance and active stakeholder involvement. The main aims of the policy framework are to reduce final energy consumption by 1.5 per cent annually (resulting in energy savings of 100 PJ) and to increase the share of renewable energy in energy consumption to 14 per cent by 2020 and 16 per cent by 2023. The framework also aims to create 15,000 additional full-time jobs annually.

46. Some PaMs are devolved to the local level. The structure of the Agreement on Energy for Sustainable Growth, which provides an overarching framework for PaMs, includes local-level actors in the development and implementation of PaMs. For example, the Green Deal programme works most actively in the field of energy and climate, and aims to provide support for civil society organizations, companies and local authorities that implement activities within the domain of the programme and non-financial support for overcoming barriers. The local climate agenda process is a joint initiative for the cooperation of local authorities, provinces and water authorities in order to exchange best practices, address legislative obstacles and implement facilitating initiatives, such as regional climate agreements.

47. The key overarching related cross-sectoral policy in the EU is the 2020 climate and energy package, adopted in 2009, which includes the revised EU ETS and the ESD. The package is supplemented by renewable energy and energy efficiency legislation and legislative proposals on the 2020 targets for CO_2 emissions from cars and vans, the carbon capture and storage directive, and the general programmes for environmental conservation, namely the 7th Environment Action Programme and the clean air policy package.

48. In operation since 2005, the EU ETS is a cap-and-trade system that covers all significant energy-intensive installations (mainly large point emissions sources such as power plants and industrial facilities) that produce 40–45 per cent of the GHG emissions of the EU. It is expected that the EU ETS will guarantee that the 2020 target (a 21 per cent emission reduction below the 2005 level) will be achieved for sectors under the scheme. The third phase of the EU ETS started in 2013 and the system now includes aircraft operations (since 2012) as well as N_2O emissions from chemical industries, PFC emissions from aluminium production and CO_2 emissions from industrial processes (since 2013). The 2030 target for the EU ETS is a 43 per cent reduction compared with the 2005 level.

49. The ESD became operational in 2013 and covers sectors outside the EU ETS, including transport (excluding domestic and international aviation, and international maritime transport), residential and commercial buildings, agriculture and waste, together accounting for 55–60 per cent of the GHG emissions of the EU. The aim of the ESD is to decrease GHG emissions in the EU by 10 per cent below the 2005 level by 2020 and it includes binding annual targets for each member State for 2013–2020. The 2030 target for the ESD is 30 per cent emission reduction compared with 2005. Under the ESD, the Netherlands has a target of reducing its total emissions to 16 per cent below the 2005 level by 2020 for non-ETS sectors.

50. The Netherlands highlighted the EU-wide mitigation actions and targets by 2030, which are under development, for emission reduction, renewable energy and energy efficiency, along with the governance for climate and energy action, including integrated reporting. The implementation of these targets is critical for the Netherlands' contribution to the attainment of the EU-wide 2030 emission reduction target of 40 per cent compared with the 1990 level.

51. The Netherlands introduced national policies to achieve its targets under the ESD and domestic emission reduction targets. The key policies reported are the subsidy scheme for renewable energy production, SDE+; the actions under the Agreement on Energy for Sustainable Growth; and the group of PaMs targeting transport and the built environment. Of these policies, the mitigation effect of the SDE+ subsidy scheme is the most significant (see table 8 below). Other policies that have delivered significant emission reductions are the group of building energy efficiency and transport policies.

52. The Netherlands highlighted the domestic mitigation actions that are under development, for implementing the commitments included in the 2017 coalition agreement reached by the new Government that came to power in November 2017. Among the mitigation actions that provide a foundation for significant additional emission reductions, the following are critical for the Netherlands to attain its 2030 emission reduction target: carbon capture and storage; the closing of all coal power stations by 2030; installation of additional offshore wind farms; the increase of industrial process efficiency; and optimizing the energy use of public buildings. Table 8 provides a summary of the reported information on the PaMs of the Netherlands.

Table 8
Summary of information on policies and measures reported by the Netherlands

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*
Policy framework and cross-sectoral measures	Actions other than those related to renewable energy sources under the 2013 Agreement on Energy for Sustainable Growth	8 700

Sector	*Key PaMs*	*Estimate of mitigation impact by 2020 (kt CO_2 eq)*
	EU ETS	NA
Energy		
Transport	Group of PaMs: fiscal policy on car efficiency, green deals, and fuel tax	10 800
Renewable energy	SDE+ subsidy scheme for renewable energy production	45 700
	Biofuels for transport	9 000
	Net metering for renewable energy production	6 000
Energy efficiency	Eco-design directive	7 000
	PaMs in the built environment	17 000
IPPU	Group of PaMs	4 100
Agriculture	Group of PaMs	1 600
Waste	Legislation on landfill and waste	4 600

Note: The estimates of mitigation impact are estimates of emissions of CO_2 or CO_2 eq avoided in a given year as a result of the implementation of mitigation actions, unless otherwise specified.

53. The Netherlands provided information during the review regarding the estimation of mitigation impacts of PaMs. The Party conducts a bottom-up ex post policy impact assessment for some of the PaMs, mostly regarding energy savings. An example was provided during the review of the performance of the SDE+ scheme between 2015 and 2017. The methodology used for the quantification of the mitigation impact of PaMs is based on the projection of a longer policy implementation.

54. The Netherlands provided data on mitigation impacts for 2020 and cumulatively for the period 2013–2020. Data collection, institutional cooperation and the methodology used for the ex post assessment of PaMs were not described. The quantified mitigation impacts of individual PaMs or groups of PaMs were not provided either for the previous reporting period or for individual years (except for 2020). The information provided on the quantified mitigation impact or ex post assessment of PaMs is limited to the assessment of PaMs with regard to their potential impact in the 2013–2020 period only.

(b) Policies and measures in the energy sector

55. **Energy supply**. The sectoral emission reduction goal for the industry and energy sectors is 10.7 Mt CO_2 eq for 2020. In the energy sector, the main policy is the EU ETS, which covers 79 electricity-generating installations, with 54 per cent of emissions covered by the EU ETS in the Netherlands (equal in 2016 to 93.88 Mt CO_2 eq). The installations in the electricity sector do not receive free allocations under the EU ETS. The Netherlands intends to introduce a minimum carbon floor price for the ETS installations, which will provide a more balanced and certain taxation of carbon. It has also been decided that the Netherlands will phase out coal-based electricity production by 2030: it has already closed down five coal-based power plants.

56. The energy tax is an important factor in determining energy prices and has been in use in the Netherlands since 1996. Concerns over natural gas extraction and triggered seismic activity around the natural gas fields accelerated the energy transition away from natural gas use, stimulated by the tariff for natural gas, which has increased by 32 per cent since 2016, while the tariff for electricity has decreased by 16 per cent. Smart metering for electricity and gas has been rolled out on a large scale, aiming for 80 per cent penetration by 2020 for households and small businesses.

57. **Renewable energy sources**. The target of the Netherlands is to increase the share of renewable energy to 14 per cent by 2020 in accordance with the EU targets. The largest emission reductions are foreseen in this sector, projected to amount to 60.5 Mt CO_2 eq in the period 2013–2020.

58. The most significant policy on renewable energy is the SDE+ scheme, which is a support scheme for large-scale production of all types of renewable energy (except for transport fuels, where the funds are granted via auctions and a sliding feed-in premium system). Within the scheme, there is a dedicated support window for offshore wind farms with the capacity of 700 MW each, for which five tenders will be organized by 2020. The onshore wind capacity is projected to reach 6,000 MW by 2020, while the offshore wind capacity will be close to 5,000 MW completed and in the construction phase.

59. The investment grant facility is available for small renewable heating systems. Net metering is also provided to accelerate the deployment of small-scale solar photovoltaics. Together, these are expected to produce 6,000 kt CO_2 eq cumulative emission reductions by 2020.

60. **Energy efficiency**. The building and industry sectors are the focus of the energy efficiency policies. The EU energy efficiency targets aim to raise energy efficiency by 20 per cent by 2020 and by 27 per cent by 2030. To achieve these targets, a linear trajectory of 1.5 per cent annual energy saving has been developed. In the building sector, the European energy performance of buildings directive requires new buildings to be almost energy neutral by 2020, with government buildings adhering to this target already in 2018.

61. The Agreement on Energy for Sustainable Growth serves as the framework policy for the improvement of energy efficiency in existing buildings and foresees energy efficiency improvements in about 300,000 buildings every year out of the total of 7.4 million residential buildings. Mandatory energy labelling for buildings has been already implemented and the National Energy Savings Revolving Fund, with a budget of EUR 300 million, provides higher mortgages for investments in energy saving measures.

62. For the social housing sector, the Agreement on Energy for Sustainable Growth foresees 24 PJ energy savings by 2020. This effort is supported by the STEP subsidy scheme, with a budget of EUR 395 million for the 2014–2018 period. The EU directive on eco-design (directive 2009/125/EC) introduces mandatory energy efficiency standards for appliances, which could lead to 7,000 kt CO_2 eq emission savings by 2020.

63. The Agreement on Energy for Sustainable Growth contains PaMs aimed at industrial energy efficiency (in the form of the long-term agreements on energy efficiency) and the voluntary agreements backed up by environmental permits on the basis of the Environmental Management Act. The long-term agreements cover 80 per cent of industrial energy consumption in the Netherlands. The Party informed the ERT during the review that additional PaMs are foreseen in 2018 aimed at introducing an obligation to inform a competent authority of energy efficiency measures taken and the standardization of payback time calculations for energy efficiency measures.

64. **Transport sector**. The most significant policies in transport are the EU common and coordinated policies and measures trasnposed by the Netherlands, including the implementation of the EU directive on renewable energy (directive 2009/28/EC), which states that the Netherlands should ensure that a minimum share of 10 per cent of all energy consumption in transport comes from renewable sources; and the EU CO_2 emission standard for cars. The transition to a sustainable fuel mix includes the increase to 10 per cent of sustainable biofuels use, with a current blending ratio of 7 per cent in 2020; and support for innovation and the use of more advanced biofuels. This measure is expected to bring 9,000 kt CO_2 eq cumulative emission reductions by 2020.

65. The Agreement on Energy for Sustainable Growth aims to achieve a 17 per cent reduction of CO_2 emissions from the transport sector by 2030, and a 60 per cent reduction of CO_2 emissions by 2050, both compared with the 1990 level. The ERT was informed by the Netherlands that it intends to allow only zero-emission new cars to enter the market from 2025, compared with the previous date set for this measure (2035). The Netherlands also informed the ERT during the review that in the new 2017 Climate and Energy Agenda

the mitigation ambition levels have been increased to 80–95 per cent CO_2 emission reductions by 2050 for the sector.

66. Other measures, including the fiscal policy on car efficiency, green deals and fuel tax, are projected to bring 10,800 kt CO_2 eq emission reductions by 2020. The Netherlands informed the ERT during the review that it is likely that additional policies will be needed to achieve the increased ambition levels defined in 2017; however, such policies have not yet been developed.

67. The NC7 includes information on how the Netherlands promotes and implements the decisions of the International Civil Aviation Organization and the International Maritime Organization to limit emissions from aviation and marine bunker fuels. For aviation, the Netherlands is to apply all four pillars of the 'four-pillar strategy' for sustainable aviation, comprising innovative technology, air traffic management measures, market-based measures and the use of sustainable biofuels. For maritime transportation, the Netherlands is monitoring a voluntary agreement with ship owners, ship operators and the logistics sector concerning the reduction of emissions.

(c) Policies and measures in other sectors

68. **Industrial processes**. The reduction of non-CO_2 gases in the industrial sector was addressed by the reduction programme for non-CO_2 gases.

69. **Agriculture**. The agriculture sector is an important sector of the economy in the Netherlands and also in terms of its emission profile, accounting for 9.8 per cent of the total GHG emissions in 2015. It was reported that 50,000 farms with 1.6 million dairy cattle are responsible for emissions of approximately 18 Mt CO_2 eq and that some 3,000 horticultural companies account for about 6 Mt CO_2 eq. The main policy framework for the sector is the Agro Covenant, established in 2008 with the aim to reduce CO_2 emissions to 3.5–4.5 Mt CO_2 eq in 2020 and non-CO_2 emissions to 4–6 Mt CO_2 eq. The PaMs are mostly aligned with the industrial energy efficiency measures such as the long-term agreements for horticulture. For non-CO_2 gases, the main PaMs are reducing manure-based biogas production; improved stable conditions; and limiting the phosphate load generated by the sector.

70. **LULUCF**. The forestry sector in the Netherlands does not play a significant part in the emission profile and the main sources of emissions in the sector are grasslands on peatland, croplands and soils in the built environment. Since 2005 the sector has been a net sink, owing to the growth of existing forests and the creation of new forests. The forestry policy is integrated into the nature policy and no specific mitigation PaMs were designed. Emissions from grasslands are influenced by the provincial regulations on the maximum limits of water levels. The Netherlands informed the ERT during the review that, in 2017, in line with the increased ambition of the EU 2030 targets, a 1.5 Mt CO_2 eq emission reduction was agreed as the target for the LULUCF sector.

71. **Waste management**. Emissions from the waste sector decreased by 76.2 per cent between 1990 and 2015 and the major source of emissions from the waste sector are landfill sites. To reduce these emissions, waste management plans are prepared for six-year periods under the Environmental Management Act. In the Netherlands, only a minimal amount of waste (2 per cent) is sent to landfill. The current waste policy aims to minimize the production of waste, to maximize recycling and recovery and to reduce the incineration of waste by 50 per cent by 2025.

(d) Minimization of adverse impacts in accordance with Article 2 and Article 3, paragraph 14, of the Kyoto Protocol

72. In the NC7 the Netherlands reported on how it strives to implement PaMs under Article 2 of the Kyoto Protocol in such a way as to minimize adverse effects, including the adverse effects of climate change and effects on social, environmental and economic impacts on other Parties, especially developing country Parties.

73. The activities undertaken by the Netherlands include the adoption of an action plan that focuses on climate change among other development areas to promote policy

coherence for development; the integration of climate action into development cooperation; increased support for climate change adaptation and mitigation in developing countries, which mainly focuses on access to renewable energy, halting deforestation, climate-smart agriculture, integrated water resources management and the provision of climate-resilient water and sanitation services; and helping to promote new market instruments as well as to adjust or expand CDM projects in developing countries.

74. The Netherlands also strives to minimize adverse effects regarding biofuel production. All biofuels on the market in Europe and the Netherlands must be in compliance with the sustainability criteria laid down by the EU renewable energy directive (directive 2009/28/EC). Only if the biofuels are sustainable are they allowed to be used for fulfilling the blending target. In addition, the country no longer provides public support, including export credits, to coal-fired power plants. Further information on how the Netherlands strives to implement its commitments under Article 3, paragraph 14, of the Kyoto Protocol in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties was reported in the Party's 2017 annual submission.

75. The Party reported on the minimization of adverse social, environmental and economic impacts on other Parties, including information about cooperation on the development of technologies, assisting developing Parties that are highly dependent on the export of fossil fuels in diversifying their economies and conducting relevant research. Examples of measures include the Private Sector Investment Programme; the project on solar farms in Uganda, "Milking the Sun"; the African Biogas Partnership Programme; the Netherlands funds for capacity-building in geothermal energy; the Geothermal Alliance for National Geothermal Capacity Building Programme in Indonesia; and the Energy Sector Management Assistance Programme.

76. The Netherlands also reported on its contribution to the Green Climate Fund, which provides climate finance to support developing countries in their mitigation and adaptation activities. The Party has initiated or joined several public–private partnerships or alliances, such as the Global Delta Coalition, the Climate Smart Agriculture Alliance and the Tropical Forest Alliance. In the Netherlands itself, with increasing environmental taxation, the externalities of energy use related to GHG emissions are increasingly reflected in energy prices. No subsidies associated with the use of environmentally unsound or unsafe technologies have been applied for many years in the Netherlands. There are subsidies only for environmentally friendly technologies or technologies that ensure increased sustainability.

(e) Assessment of adherence to the reporting guidelines

77. The ERT assessed the information reported in the NC7 of the Netherlands and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 9.

Table 9
Findings on policies and measures, including those in accordance with Article 2 of the Kyoto Protocol, from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 23 Issue type: transparency Assessment: encouragement	The NC7 provides details of the effect of PaMs for the period 2013–2020 as cumulative values for eight years, aggregating the PaMs into large groups. This does not give sufficiently transparent information on status to date and the annual progress for each group of PaMs or for individual PaMs. This issue was also identified during the review of the NC6. During the review, the Netherlands provided additional information on the disaggregated quantified impacts of PaMs, including SDE+, the long-term agreement (for 2006–2012) and the long-term agreements on energy efficiency (for 2014). The ERT encourages the Netherlands to increase the transparency of its reporting by including, as appropriate, quantified impacts for a specific year rather than aggregated impacts over a time period, because this would improve interpretability and allow for a better assessment of how individual PaMs are contributing to

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
		achieving the target.
2	Reporting requirement[a] specified in paragraph 18 Issue type: transparency Assessment: encouragement	The NC7 includes information that is primarily for the non-ETS sectors. It informed the ERT during the review about PaMs other than the EU ETS that influence emissions from installations falling within the scope of the EU ETS. Such policies include EU-level regulations (e.g. air quality legislation) and national policies and legislation (e.g. the decision to stop coal-based power generation by 2030). The ERT encourages the Netherlands to provide a brief description of the implementation and impacts of the EU ETS in the Netherlands, to highlight any changes linked to the implementation of the EU ETS in the Netherlands or the effects achieved, and to provide information on the PaMs that have an impact on the emissions of the Netherlands for all sectors.
3	Reporting requirement[b] specified in paragraph 36 Issue type: completeness Assessment: recommendation	The NC7 does not include information about the implementation of PaMs under Article 2 of the Kyoto Protocol relevant to the minimization of the adverse effects of climate change or the impact of PaMs on international trade. The ERT noted that this information was also missing from the NC6 and the Netherlands was recommended in the previous review report to include it in the NC7. During the review, this issue was discussed and clarified with the Party. The ERT agreed with the reiteration of the recommendation. The ERT reiterates the recommendation made in the previous review report that the Netherlands include information on how it strives to implement its PaMs in such a way as to minimize the adverse effects of climate change and the impact of PaMs on international trade.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs.

[b] Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information.

C. Projections and the total effect of policies and measures, including information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

1. Projections overview, methodology and results

(a) Technical assessment of the reported information

78. The Netherlands reported updated projections for 2020 and 2030 relative to actual inventory data for 2015 or, where possible, 2016 under the WEM scenario. The WEM scenario reported by the Netherlands includes implemented and adopted PaMs as at 1 May 2017.

79. In addition to the WEM scenario, the Netherlands reported the WAM scenario. The WAM scenario includes planned PaMs that were not officially implemented by 1 May 2017. The Netherlands provided a definition of its scenarios, explaining that its WEM scenario includes policies currently implemented and adopted as at 1 May 2017. It includes measures that are sufficiently concrete and have been made binding, such as the EU ETS, SDE+, the abolition of the milk quota, and concrete and binding measures of the Agreement on Energy for Sustainable Growth.

80. The WOM scenario is not included in the projections because climate and energy policies have already been implemented in the Netherlands since the early 1990s. Since then, policies have been elaborated (such as subsidy schemes for sustainable energy production and energy efficiency policies), discontinued (such as the Benchmarking Covenant) or newly created, both nationally (such as the Agreement on Energy for Sustainable Growth) or as a result of European policies (such as the EU ETS and the EU directive on eco-design) and their revisions.

81. Many policies are cross-sectoral, but each sector also has its specific policies. This situation has resulted in a complex framework of PaMs, making the construction of a WOM scenario (for instance, no new policies after 2000) very difficult. The definitions indicate that the scenarios were prepared according to the UNFCCC reporting guidelines on NCs.

82. The Netherlands used the 1990–2015 GHG inventory data as a basis for calculating projections for 2020 and 2030 under the WEM and WAM scenarios. The ERT noted that the projections calculated for each of the two scenarios were based on the Netherlands' total GHG emissions including emissions from the LULUCF sector, which is not in line with the UNFCCC reporting guidelines on NCs. During the review, the Netherlands resubmitted the CTF tables with the necessary corrections; however, the projected values included in the NC7 remain unchanged (see issue 2 in table 13).

83. The projections are presented on a sectoral basis, using the same sectoral categories as those used in the reporting on mitigation actions, and on a gas-by-gas basis for CO_2, CH_4, N_2O, PFCs, HFCs and SF_6 (treating PFCs and HFCs collectively in each case) as well as NF_3 for 2016–2030 (for 2016 provisional inventory data were presented). The projections are also provided in an aggregated format for each sector as well as for a Party total using GWP values from the IPCC Fourth Assessment Report.

84. The Netherlands reported emission projections for indirect GHGs, such as nitrogen oxides, non-methane volatile organic compounds and sulfur oxides, in the text. However, projections for emissions of indirect GHGs were not included in the CTF tables.

85. Emission projections related to fuel sold to ships and aircraft engaged in international transport were reported separately and not included in the totals. The Netherlands reported on factors and activities affecting emissions for each sector.

(b) Methodology, assumptions and changes since the previous submission

86. The data on GHG emissions that formed the background for the projections in the NC7 were collected and processed using the 2006 IPCC Guidelines, while the NC6 projections were based on estimates obtained using the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*. The base year for most modelling parameters is 2015 or, where possible, 2016.

87. The projections described in the NC7 are based on the NEV 2017, which describes the most plausible developments based on available information about prices, markets, technology and policies. The NEV 2017 also projects emission levels up to 2035 (instead of 2030). For the NC6, the reference projections made in 2010 for the NC5 and updated in 2012 (Geactualiseerde Referentieraming 2012) were used as a basis for the projections, while for the BR2 the National Energy Outlook 2015 (an earlier version of the NEV 2017) was used.

88. Unlike for the NC6, the scenarios used for the NC7 take into account the PaMs of the Agreement on Energy for Sustainable Growth regarding energy policies up to the 2020–2023 period and the implementation of the 2006 IPCC Guidelines (e.g. GWP values from the IPCC Fourth Assessment Report). The NEV 2017 incorporated new insights into economic and demographic developments, sectoral developments, fossil fuel prices, CO_2 prices and policies. Advances in exogenous modelling assumptions were taken into account up to May 2017, using official national statistics, mainly from Statistics Netherlands and the Pollutant Release and Transfer Register, where available.

89. The Netherlands provided a detailed description of the model used for projecting emissions from the energy sector and transport; however, for other sectors (IPPU, agriculture, waste and LULUCF) the approach to modelling and the key features of the relevant models were not described in the NC7. During the review, the Party provided detailed explanations of the modelling approaches used for each sector, including gas coverage, purpose and key assumptions, as well as the strengths and weaknesses of the models used for each sector.

90. The energy needs for the IPPU, agriculture and waste sectors were projected using the SAVE model, which is a simulation model for the services sector. On the basis of the

economic growth per subsector and the measures taken, SAVE calculates the future gas and electricity demand. In order to calculate projected emissions from agriculture, the Party used projections for livestock numbers based on historical inventory data that were developed for economic research purposes, and those data were used as input to the NEMA model, which takes into account, among other parameters, rates of digestion, proportion of time spent indoors and outside, and composition of fodder that may be affected by the policy decisions.

91. Emission projections for the LULUCF sector were made using a simple spreadsheet model that uses spatial developments based on expert judgment and the spatial analysis for the 2050 scenarios. Emissions from solid waste disposal were modelled explicitly by Rijkswaterstaat (the national water agency). The main concept of the model is based on the organic matter decay calculation approach from the 2006 IPCC Guidelines, using a combination of default and country-specific parameters (see issue 3 in table 13).

92. To prepare its GHG emission projections, the Netherlands relied on the key underlying assumptions associated with the following variables: GDP growth; population and population growth; number of households; floor space in utility buildings and inhabited dwellings; international fuel prices (oil, gas and coal); mileage travelled by passengers and tonnage per distance index for freight transportation; and livestock statistics for the agriculture sector. These variables and the assumptions regarding their values were reported in CTF table 5. The information describing the underlying assumptions was not included in CTF table 5 or the NC7.

93. During the review, the Netherlands explained that the assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections, and it described the assumptions associated with the variables presented in table 5.3 of the NC7 and CTF table 5 (see issue 4 in table 13).

94. The particulars of the key assumptions were as follows: the growth of the economy and the population will continue; fuel prices will change as projected in the World Energy Outlook; the use of passenger vehicles will increase following the economic growth and population increase, which will also cause an increase in the use of passenger cars per household; freight transport will increase (both in tonnage and mileage) owing to economic growth and increase in services; as the Agreement on Energy for Sustainable Growth has ruled out coal use, emissions from coal will decrease; the amount of energy demand for heating stables in agriculture will increase due to livestock growth; and the contribution of biomass to energy consumption will decrease after 2025 because by then there will be almost no subsidies for use of the fuel. The Party explained that there were additional category-specific assumptions including, but not limited to, recycling, waste management and urban development. These were not presented in CTF table 5, but were used for modelling purposes in the underlying projections (see issue 5 in table 13).

95. The Netherlands did not provide information on the changes since the submission of its NC6 regarding the assumptions, methodologies, models and approaches used and on the key variables and assumptions used in the preparation of the projection scenarios. During the review, the Netherlands explained that the changes in key assumptions, variables and modelling methods were included in the NEV 2017 and are updated on an annual basis. The reference to the publication is included in the NC7.

96. Sensitivity analyses were not included in the NC7. During the review, the Netherlands explained that sensitivity analyses for different variables were performed in different years. For example, the analysis of sensitivity to the share of renewable sources used in the energy sector was performed in 2017 (see issue 1 in table 13).

(c) Results of projections

97. The projected emission levels under different scenarios, and information on the Kyoto Protocol target and the quantified economy-wide emission reduction target are presented in table 10 and the figure below.

Table 10
Summary of greenhouse gas emission projections for the Netherlands

	GHG emissions (kt CO_2 eq per year)	*Changes in relation to base-year[a] level (%)*	*Changes in relation to 1990 level (%)*
Kyoto Protocol base year[b]	223 950.67	NA	1.1
Quantified emission limitation or reduction commitment under the Kyoto Protocol (2013–2020)[c]	114 995.42	NA	NA
Quantified economy-wide emission reduction target under the Convention[d]	NA	NA	NA
Inventory data 1990[e]	221 416.70	–1.1	NA
Inventory data 2015[e]	195 245.67	–12.8	–11.8
WEM projections for 2020[f]	171 274.00	NA	–23.3
WAM projections for 2020[f]	169 680.00	NA	–24.1
WEM projections for 2030[f]	156 177.00	NA	–29.5
WAM projections for 2030[f]	153 674.00	NA	–30.6

Note: Updated projections were provided by the Party during the review; the projections are for GHG emissions without LULUCF.

[a] "Base year" in this column refers to the base year used for the target under the Kyoto Protocol, while for the target under the Convention it refers to the base year used for that target.

[b] The Kyoto Protocol base-year level of emissions is provided in the initial review report, contained in document FCCC/IRR/2016/NLD.

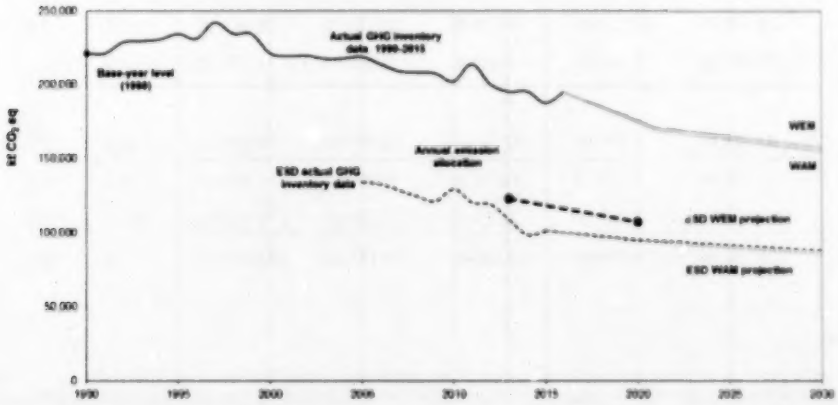
[c] The Kyoto Protocol target for the second commitment period (2013–2020) is a joint target of the EU and its 28 member States and Iceland. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. The target for non-ETS sectors is 16 per cent for the Netherlands under the ESD.

[d] The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its 28 member States. The target is to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020.

[e] From the Netherlands' 2017 GHG inventory submission; the emissions are without LULUCF (includes indirect emissions).

[f] From the Netherlands' NC7.

Greenhouse gas emission projections reported by the Netherlands



Sources: (1) data for the years 1990–2015: the Netherlands' 2017 annual inventory submission, version 5; total GHG emissions excluding LULUCF; (2) data for the years 2016–2030: updated projections provided by the Party during the review.

98. Under the WEM scenario, the Netherlands' total GHG emissions excluding LULUCF and including indirect emissions of CO_2 in 2020 and 2030 are projected to be 171,274.00 and 156,177.00 kt CO_2 eq, respectively, which represents a decrease of 23.3 and 24.1 per cent, respectively, below the 1990 level. Under the WAM scenario, emissions in 2020 and 2030 are projected to be lower than those in 1990 by 29.5 and 30.6 per cent and amount to around 169,680.00 and 153,674.00 kt CO_2 eq, respectively. The 2020 projections suggest that the Netherlands will continue contributing to the achievement of the EU target under the Convention by reducing its emission levels by 2020 under both reported scenarios.

99. During the review, the Netherlands explained that the currently tabled domestic target of a 20 per cent reduction in emissions below the 1990 level by 2020 may change to 25 per cent below the 1990 level as a result of the court case that the Government is currently involved in. The projected emission reduction values by 2020 reported in the NC7 are 23.3 and 24.1 per cent under the WEM and WAM scenarios, respectively. If a domestic target of a 25 per cent emission reduction by 2020 below the 1990 level is formally confirmed, the Netherlands may face challenges in achieving its domestic target. Thus, more ambitious additional PaMs could be required to ensure that the Netherlands achieves its target emission level by 2020.

100. The Netherlands' target for non-ETS sectors is to reduce its total emissions by 16 per cent below the 2005 level by 2020 (see para. 49 above). The Party's AEAs, which correspond to its national emission target for non-ETS sectors, change linearly from 122,948.13 kt CO_2 eq in 2013 to 107,362.87 kt CO_2 eq in 2020. According to the projections under the WEM scenario, emissions from non-ETS sectors are estimated to reach 95,138.43 kt CO_2 eq by 2020. Under the WAM scenario, the Netherlands' emissions from non-ETS sectors in 2020 are projected to be 94,165.50 kt CO_2 eq. Under the WEM and WAM scenarios, the ESD projections for 2020 are below the AEAs for 2020 by 11.4 and 12.3 per cent, respectively (see the figure above). This suggests that the Netherlands expects to meet and overachieve its target for non-ETS sectors under the WEM scenario.

101. The Netherlands presented the WEM and WAM scenarios by sector for 2020 and 2030, as summarized in table 11.

Table 11
Summary of greenhouse gas emission projections for the Netherlands presented by sector

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Sector	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
Energy (not including transport)	128 264.00	109 062.00	107 826.00	94 749.00	93 197.00	–15.0	–15.9	–26.1	–27.3
Transport	28 140.00	29 734.00	29 276.00	30 628.00	28 887.00	5.7	4.0	8.8	2.7
Industry/ industrial processes	24 851.00	11 199.00	11 299.00	10 650.00	11 350.00	–54.9	–54.5	–57.1	–54.3
Agriculture	25 315.00	18 750.00	18 750.00	18 570.00	18 660.00	–25.9	–25.9	–26.6	–26.3
LULUCF	6 060.00	6 332.00	6 332.00	6 806.00	6 806.00	4.5	4.5	12.3	12.3
Waste	14 180.00	2 529.00	2 529.00	1 580.00	1 580.00	–82.2	–82.2	–88.9	–88.9
Total GHG emissions without LULUCF, with indirect CO_2	**220 750.00**	**171 274.00**	**169 680.00**	**156 177.00**	**153 674.00**	**0.0**	**–20.2**	**0.0**	**–27.7**

Sources: (1) GHG emission data: the Netherlands' 2017 annual inventory submission, version 5; (2) GHG projections data: the Netherlands' CTF tables, version 4.

102. According to the projections reported for 2020 under the WEM scenario, the most significant emission reductions are expected to occur in the energy (excluding transport), IPPU and waste sectors, amounting to projected reductions of 19,202.00 kt CO_2 eq (15.0 per cent), 13,652.00 kt CO_2 eq (54.9 per cent) and 11,651.00 kt CO_2 eq (82.2 per cent) between 1990 and 2020, respectively. These changes are largely attributable to the effects of the SDE+ subsidy scheme, the group of PaMs for built environment, the EU directive on eco-design (industry energy efficiency), the group of PaMs for industry, net metering and legislation on landfills and waste. The total effect of these policies by 2020 is projected to be 25,935.00 kt CO_2 eq.

103. The pattern of projected emissions reported for 2030 under the WEM scenario remains the same. The decrease in emissions from the energy sector (excluding transport) continues to prevail and largely defines the pattern, with the absolute decrease in projected emissions from the sector decreased by a further 14,313.00 kt CO_2 eq from 2020 and resulting in a decrease of the projected emissions for the energy sector of 33,515.00 kt CO_2 eq (26.1 per cent) for 2030 compared with 1990.

104. Emissions from the transport sector are projected to increase from 1990 to 2020 by 1,594.00 kt CO_2 eq (5.7 per cent), and by 2030 a further increase of 894.00 kt CO_2 eq is expected, bringing the projected change in the emissions from this sector between 1990 and 2030 to an increase of 2,488.00 kt CO_2 eq (8.8 per cent). Despite the projected increase in emissions from transport under the WEM scenario during 1990–2020, the projections show that the average annual rate of growth in transport emissions will be significantly moderated by the effect of PaMs (7,481.00 kt CO_2 eq in 2020), which are predicted to result in a 55.7 per cent reduction of the average annual emission growth since 1990 from the sector.

105. If additional measures are considered (i.e. under the WAM scenario), the patterns of emission reductions by 2020 presented by sector and by gas remain the same, with the energy sector (excluding transport) demonstrating the largest reduction from the 1990 level with absolute values of 20,438.00 kt CO_2 eq (15.9 per cent) by 2020 and 35,067.00 kt CO_2 eq (27.3 per cent) by 2030. Emissions from transport under the WAM scenario are projected to increase from the 1990 level by 1,136.00 kt CO_2 eq (4.0 per cent) by 2020 and by 746.0 kt CO_2 eq (2.7 per cent) by 2030. The Netherlands presented the WEM and WAM scenarios by gas for 2020 and 2030, as summarized in table 12.

Table 12
Summary of greenhouse gas emission projections for the Netherlands presented by gas

	GHG emissions and removals (kt CO_2 eq)					*Change (%)*			
		2020		*2030*		*1990–2020*		*1990–2030*	
Gas	*1990*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*	*WEM*	*WAM*
CO_2	162 271.00	143 133.00	141 540.00	130 742.00	128 186.00	–11.8	–12.8	–19.4	–21.0
CH_4	32 316.00	18 077.00	18 077.00	16 669.00	16 722.00	–44.1	–44.1	–48.4	–48.3
N_2O	17 687.00	7 884.00	7 884.00	7 786.00	7 786.00	–55.4	–55.4	–56.0	–56.0
HFCs	5 606.00	1 926.00	1 926.00	805.00	805.00	–65.6	–65.6	–85.6	–85.6
PFCs	2 663.00	138.00	138.00	138.00	138.00	–94.8	–94.8	–94.8	–94.8
SF_6	207.00	116.00	116.00	38.00	38.00	–44.0	–44.0	–81.6	–81.6
NF_3	IE	IE	IE	IE	IE	NA	NA	NA	NA
Total GHG emissions without LULUCF, including indirect CO_2	**220 750.00**	**171 274.00**	**169 681.00**	**156 178.00**	**153 675.00**	**–22.4**	**–23.1**	**–29.3**	**–30.4**

Sources: (1) GHG emission data: the Netherlands' 2017 annual inventory submission, version 5; (2) GHG projections data: the Netherlands' CTF tables, version 4.

106. Under the WEM scenario, the most significant reductions from 1990 to 2020 are projected for CO_2 emissions at 19,138.00 kt CO_2 eq (11.8 per cent). The reduction is mostly due to the effects of the SDE+ subsidy scheme, the group of PaMs addressing the built environment, the EU directive on eco-design (industry energy efficiency) and the group of PaMs addressing industrial emissions. The total effect of those policies by 2020 is projected to be 22,925.00 kt CO_2 eq.

107. Under the WEM scenario, the most significant reductions from 1990 to 2030 are projected for CO_2 emissions at 31,529.00 kt CO_2 eq (19.4 per cent).

108. If additional measures are considered (i.e. in the WAM scenario), the patterns of emission reductions by 2020 presented by sector and by gas remain the same. The biggest change from 1990 and 2020 is projected for CO_2 emissions at 20,731.00 kt CO_2 eq (12.8 per cent). From 1990 to 2030 the projected change in CO_2 emissions is 34,085.00 kt CO_2 eq (21.0 per cent).

(d) Assessment of adherence to the reporting guidelines

109. The ERT assessed the information reported in the NC7 of the Netherlands and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 13.

Table 13
Findings on greenhouse gas emission projections reported in the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 30 Issue type: transparency Assessment: encouragement	The NC7 did not include sensitivity analyses for projections under either the WEM or the WAM scenario. The issue was also raised in the previous review report. During the review, the Netherlands explained that sensitivity analyses for different variables are performed in different years. However, information on the results of the analyses is not in the public domain (see para. 96 above). The ERT welcomes the Party's clarification and, to improve the transparency of the model description for both the WEM and WAM scenarios, encourages the Party to include the results of the sensitivity analyses in its next NC.
2	Reporting requirement specified in paragraph 31 Issue type: transparency Assessment: recommendation	The NC7 reported emission projections for the WEM scenario that are based on the total GHG emissions without LULUCF. However, the background data for the projections were not consistent with the actual inventory data for the total GHG emissions without LULUCF for the preceding years. During the review, the Party resubmitted the CTF tables to correct this error; however, the projection values in the body of the NC7 remain the same (see para. 82 above). The ERT welcomed the Party's efforts in making corrections and accepted the resubmitted CTF tables. The ERT recommends that the Netherlands make further efforts to ensure consistency between the inventory data and its NCs in order to improve the transparency of the projections section of the report. The Party may, for example, include specific procedures in the existing quality control plan to check consistency between the actual inventory data, the background data used in the projection calculations and the content of the projections tables reported in its NCs.
3	Reporting requirement specified in paragraph 43 Issue: completeness Assessment:	The NC7 did not include a description of modelling approaches for the IPPU, agriculture, waste and LULUCF sectors or the key features of the relevant models. During the review, the Party provided detailed explanations of the modelling approaches used for each sector, including gas coverage, purpose and key assumptions, as well as strengths and weaknesses of the models used for each

No.	Reporting requirement, issue type and assessment	Description of the finding with recommendation or encouragement
	encouragement	sector. The ERT welcomed the Party's explanations and, to improve completeness, encourages the Netherlands to include a brief description of the modelling approach used for each sector in its next NC.
4	Reporting requirement specified in paragraph 45 Issue type: transparency Assessment: encouragement	The Netherlands did not provide information in the NC7 on the differences in the assumptions, methodologies, models and approaches used, or on the key variables and assumptions used in the preparation of the projection scenarios, since the submission of its NC6. During the review, the Netherlands explained that the changes in key assumptions, variables and modelling methods were included in the NEV 2017 and are updated on an annual basis. The reference to the publication is included in the NC7. The ERT welcomes the Party's clarifications and, to improve transparency, encourages the Party to include the summative description of the changes in models between different submissions in its next NC.
5	Reporting requirement specified in paragraph 47 Issue type: transparency Assessment: encouragement	The NC7 did not provide information describing the underlying assumptions associated with the variables used in the modelling (e.g. GDP, population, population growth) (see paras. 92 and 93 above). During the review, the Netherlands explained that the assumptions were updated on the basis of the most recent economic developments known at the time of the preparation of the projections, and it described the assumptions associated with the variables presented in the NC7. The Party also explained that there were additional category-specific assumptions, including, but not limited to, recycling, waste management and urban development, which were not presented in table 5.3 of the NC7 but were used for modelling purposes in the underlying projections. The ERT welcomes the Party's explanations and, to improve transparency, encourages the Party to include the description of the key assumptions used for the modelling in its next NC.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

2. Assessment of the total effect of policies and measures

(a) Technical assessment of the reported information

110. In the NC7 the Netherlands presented the estimated and expected total effect of implemented and adopted PaMs and an estimate of the total effect of its PaMs, in accordance with the WEM scenario, compared with a situation without such PaMs. Information is presented in terms of GHG emissions avoided or sequestered, by gas (on a CO_2 eq basis), in 2020. It also presented relevant information on factors and activities for each sector for 1990–2020.

111. The Netherlands reported that the total estimated effect of its adopted and implemented PaMs is 38,758.20 kt CO_2 eq. According to the information reported in the NC7, PaMs implemented in the energy sector will deliver the largest emission reductions, followed by PaMs implemented in the transport sector. Table 14 provides an overview of the total effect of PaMs as reported by the Netherlands.

112. The Netherlands reported the total effect of PaMs by gas for 2020 and 2030. The greatest reduction will be achieved in CO_2 (24 and 25.7 Mt, respectively). Under both the WEM and WAM scenarios, reductions of 0.5 Mt CO_2 eq for CH_4, 0.3 Mt CO_2 eq for N_2O and 0.4 Mt CO_2 eq for F-gases are expected.

113. Additional emission reductions of 15 Mt CO_2 eq under the WEM scenario or 16 Mt CO_2 eq under the WAM scenario are expected for the period 2020–2030. From 2021 to 2030, CO_2 emissions are anticipated to decrease by 12.4 and 13.4 Mt CO_2 eq, respectively. Under both the WEM and WAM scenarios, CH_4 emissions are expected to decrease by 1.4 Mt CO_2 eq, N_2O emissions by 0.1 Mt CO_2 eq and F-gases by 1.2 Mt CO_2 eq.

114. The NC7 includes the total effect of PaMs in 1995, 2000, 2005, 2010, 2015, 2020 and 2030 by gas, but not by sector. During the review, the Party provided information on the total effect of PaMs by sector and for cross-cutting PaMs for 2030. The Party explained that an accurate distinction of the effects of PaMs between the sectors is not always possible because some of them have an integrated impact on several sectors. For example, the reduction programme for non-CO_2 GHGs includes N_2O reduction measures in industrial processes and the reduction of waste disposal in landfills, which have an effect on emissions from both the IPPU and waste sectors (see issue 1 in table 15).

115. The reduction in CO_2 emissions already achieved through individual PaMs was not reported in the NC7. During the review, the Party explained that this information is not readily available. Although all Dutch policies are required to be evaluated periodically on an ex post basis, the evaluations are performed for individual PaMs with their own timing, system boundaries and evaluation criteria (effect on CO_2 emissions is not always a criterion). Therefore, there is no single integrated ex post evaluation for all PaMs indicating the effect of each PaM on CO_2 emissions. Nevertheless, the monitoring of PaMs and their ex post evaluations provide crucial data that are used by experts in the NEOMS[4] modelling.

Table 14
Projected effects of the Netherlands' planned, implemented and adopted policies and measures by 2020 and 2030

	2020		*2030*
Sector	*Effect of implemented and adopted measures (kt CO_2 eq)*	*Effect of planned measures (kt CO_2 eq)*	*Effect of implemented and adopted measures (kt CO_2 eq)*
Energy (without transport)	20 714.20	237.00	39 190.00
Transport	7 481.00		9 370.00
Industrial processes	1 134.00		5 700.00[a]
Agriculture	100.00		100.00
LULUCF	NA		NA
Waste management	1 310.00		not included
Cross-cutting PaMs	8 019.00		18 360.00[b]
Total	**38 521.20**	**237.00**	**68 410.00**

Sources: (1) for 2020, the Netherlands' BR3 CTF table 3; (2) for 2030, materials provided by the Netherlands during the review week.

Note: The total effect of implemented and adopted PaMs is determined by comparing the WAM scenario from the NEV 2017 projections with a situation where no policy changes are assumed after 2012 to take into account the impact of the Agreement on Energy for Sustainable Growth (2013), which is the main policy framework in the Netherlands. For the establishment of this reference, the policy scenario "Without the Energy Agreement" from the NEV 2017 was used. In order to determine the impact of EU regulations and other national PaMs adopted before 2013, the projections from 2012 were used as a reference. For the EU and national PaMs, the impact of changes after 2012 was determined by comparing the WEM scenario with the "Without the Energy Agreement" scenario from the NEV 2017.

[a] Includes the group of PaMs for industry and the EU F-gas regulation.

[b] Excludes the group of PaMs for industry and the EU F-gas regulation.

[4] The National Energy Outlook Modelling System (NEOMS) is the primary modelling suite, developed for over 20 years by the Energy Research Centre of the Netherlands and the Environmental Assessment Agency for projections and policy evaluations.

(b) Assessment of adherence to the reporting guidelines

116. The ERT assessed the information reported in the NC7 of the Netherlands and identified an issue relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The finding is described in table 15.

Table 15
Findings on the assessment of the total effect of policies and measures from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 41 Issue type: transparency Assessment: encouragement	The NC7 did not include the total effect of PaMs presented by sector, although projections by individual sector were reported for the WEM scenario. During the review, the Party provided information on the total effect of PaMs by sector as well as for cross-cutting PaMs for 2030. The ERT commends the Netherlands for providing the information on effects of PaMs by sector for 2030. To improve the transparency of reporting the effect of PaMs, the ERT encourages the Party to include in its next NC information on the total effect of PaMs for individual sectors (similar to NC7 table 5.1 showing impact by gas) for the period 1995–2030 for the years for which information is available.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

3. Supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol

(a) Technical assessment of the reported information

117. In the NC7 the Netherlands provided information on how its use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it did not elaborate on supplementarity as such. The information presented concerns mainly credit units from the Kyoto Protocol market-based mechanisms acquired for the first commitment period and contained in the Dutch registry at the end of 2016. During the review, the Netherlands informed the ERT that the operation of the Kyoto Protocol market-based mechanisms is being facilitated, but no emission credits have been acquired by the Government. During the review, the ERT learned that the Netherlands does not plan to use the market-based mechanisms to meet its Kyoto Protocol target. In addition, no units from market-based mechanisms and LULUCF have been used to meet the Kyoto Protocol target for the second commitment period.

118. The Government informed the Parliament in 2011 of its expectation that the emission reduction target for non-ETS sectors could be achieved domestically and that it would not be necessary to buy units from market-based mechanisms such as the CDM and joint implementation. It was further decided that the unused credits would be cancelled.

119. During the first commitment period, the Netherlands contracted 33.2 Mt carbon credits from CDM projects, 17.1 Mt from joint implementation projects, 3 Mt carbon credits from Latvia (Green Investment Scheme) and 2.2 Mt from participation in carbon funds in order to meet its obligations under the Kyoto Protocol.

(b) Assessment of adherence to the reporting guidelines

120. The ERT assessed the information reported in the NC7 of the Netherlands and identified an issue relating to transparency. The finding is described in table 16.

Table 16
Findings on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation*
1	Reporting requirement specified in paragraph 33 Issue type: transparency Assessment: recommendation	The NC7 did not provide transparent information on the use of the flexible market-based mechanisms in terms of their supplementarity to domestic action for the second commitment period of the Kyoto Protocol. The ERT noted that the Netherlands included the information that it does not plan to use the Kyoto Protocol market-based mechanisms in the BR3; however, this was not reflected in the NC7. During the review, the Netherlands informed the ERT that, according to the Government's decision, no credits will be used to meet the emission reduction target for the second commitment period of the Kyoto Protocol. Therefore, there is no supplementarity to domestic action. The ERT recommends that the Netherlands include in its next NC information on the use of credits and its plans for the use of credits (even if it does not plan to use them) to meet its commitments under the second commitment period of the Kyoto Protocol.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the reporting guidelines for supplementary information. The reporting on the requirements not included in this table is considered to be complete and transparent.

D. Provision of financial and technological support to developing country Parties, including information under Articles 10 and 11 of the Kyoto Protocol

1. Financial resources, including under Article 11 of the Kyoto Protocol

(a) Technical assessment of the reported information

121. The Netherlands reported information on the provision of financial support required under the Convention and its Kyoto Protocol, including on financial support provided, committed and pledged, allocation channels and annual contributions.

122. The Netherlands indicated what "new and additional" financial resources it has provided and clarified how it has determined such resources as being "new and additional". The Netherlands considers all annual disbursements approved by the Parliament in the Dutch Government's budget as "new and additional" financial resources for 2015 and 2016. The ERT noted that for the NC6 the Netherlands used another definition, according to which the financial resources beyond its ODA of 0.7 per cent of gross national income were defined as "new and additional". The new definition of "new and additional" makes it difficult for the ERT to make a direct comparison with 2015–2016 and to quantify the trends in ODA. During the review, the Netherlands clarified that despite the economic crisis that began in 2008 it maintained its (average) ODA spending at 0.7 per cent of GDP in 2010–2012, and that during the period under review climate finance was generally additional to the 0.7 per cent ODA spending for the Millennium Development Goals, as reported in its NC6.

123. The Netherlands reported that it delivered on its commitment of fast-start finance during 2010–2012. In the period since fast-start finance, it has chosen what it considers to be a more 'flexible' approach in line with its pledge of contributing a "fair share" to the costs of mitigation and adaptation to climate change in developing countries. The Netherlands did not clarify how it determined its "fair share" of contributions.

124. The Netherlands reported on private climate finance in line with the joint statement on tracking progress towards the USD 100 billion goal adopted by the major donors in September 2015, according to which private climate finance is defined as "private finance for climate-relevant activities that has been mobilized by public finance or by a public policy intervention, including technical assistance to enable policy and regulatory reform". The Netherlands described the methodological choices it made in defining what it considers as public and private entities, direct versus indirect mobilization, types of public finance

instrument, attribution, data and point of measurement. The Netherlands classifies developing countries on the basis of the list of ODA recipients of the Development Assistance Committee of the Organisation for Economic Co-operation and Development. Consequently, the NC7 provides 'best estimates' of the private finance that was mobilized by public finance from the Netherlands to support developing country Parties.

125. Table 17 provides information on the public financial support provided by the Netherlands over the period 2013–2016 to developing country Parties through multilateral and bilateral channels.

Table 17
Summary of information on provision of financial support by the Netherlands in 2013–2016
(Millions of United States dollars)

Allocation channel of public financial support	*Year of disbursement*			
	2013	*2014*	*2015*	*2016*
Official development assistance[a]	5 435.45	5 572.97	5 725.51	4 966.26
Climate-specific contributions through multilateral channels, including:	40.16	18.21	12.40	31.83
Global Environment Facility	14.53	15.05	0	15.77
Least Developed Countries Fund	25.00	0	0	0
Montreal Protocol	631.05	3.16	3.34	3.34
Green Climate Fund	0	0	9.05	12.72
Financial institutions, including regional development banks:	44.02	93.50	188.82	161.56
World Bank	43.74	13.93	133.84	139.50
International Finance Corporation	0	13.11	6.07	2.40
African Development Bank		55.70	37.84	13.25
Asian Development Bank	0	0.53	4.05	0.40
European Bank for Reconstruction and Development	0.03	0	0	0
United Nations bodies, including:	5.72	22.79	42.22	62.75
United Nations Development Programme	3.59	1.96	1.64	1.52
United Nations Environment Programme	1.78	1.87	2.90	1.68
Food and Agriculture Organization of the United Nations	0.31	0.33	1.12	6.00
International Fund for Agricultural Development	0	12.68	18.07	39.39
Other	0.03	0	1.85	1.42

[a] *Sources*: (1) Query Wizard for International Development Statistics, available at http://stats.oecd.org/qwids/; (2) the Netherlands' BR3 CTF tables.

(b) Assessment of adherence to the reporting guidelines

126. The ERT assessed the information reported in the NC7 of Netherlands and identified issues relating to transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 18.

Table 18
Findings on financial resources, including under Article 11 of the Kyoto Protocol, from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement[a] specified in paragraph 51	The Netherlands reported in its NC7 that it considers financial resources allocated over 2013–2016 as "new and additional" because its budgets are approved by the Parliament on an annual basis.
	Issue type: transparency Assessment: recommendation	The ERT recommends that the Netherlands provide transparent and detailed information to show how it determines financial resources as "new and additional". For example, if such allocation is made in comparison to the budget for previous years, it would be useful to provide the relevant figures.
2	Reporting requirement[a] specified in paragraph 53	The Netherlands provided in its NC7 information in table 7.4(b) on public financial support by organization and in table 7.5 on climate finance allocated through bilateral, regional and other channels in a slightly different format than is required by the UNFCCC reporting guidelines on NCs. The Party explained that this was done to "bring those tables in line with the improved format of the CTF tables used for the BR". However, the modified tables do not include the values in United States dollars as required by the UNFCCC reporting guidelines on NCs.
	Issue type: transparency Assessment: encouragement	During the review, the Netherlands provided detailed information on its financial support in euro and in United States dollars, including information on the exchange rates used for conversion.
		The ERT encourages the Netherlands to enhance the transparency of the reporting in its next NC by including the information in United States dollars in tables 7.4(b) and 7.5.
3.	Reporting requirement[b] specified in paragraph 41	The Netherlands reported in its NC7 that it considered financial resources allocated over 2013–2016 as "new and additional"; however, it did not provide information on how it took into account the need for adequacy and predictability in the flow of those resources.
	Issue type: completeness	
	Assessment: recommendation	The ERT recommends that the Netherlands provide information on how it took into account the need for adequacy and predictability in the flow of the resources.

Note: The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

[a] Paragraph numbers listed under reporting requirement refer to the relevant paragraphs of the UNFCCC reporting guidelines on NCs.

[b] Paragraph numbers listed under reporting requirement refer to the relevant paragraph of the reporting guidelines for supplementary information.

2. Technology development and transfer, including information under Article 10 of the Kyoto Protocol

(a) Technical assessment of the reported information

127. The Netherlands provided information on steps, measures and activities related to technology transfer, access and deployment benefiting developing countries, including information on activities undertaken by the public and private sectors. The Netherlands stated that it does not track technology development and transfer and provided an illustrative list of activities supported, in a format that it stated had been brought in line with the improved format for the CTF tables used for the BR2 and BR3. The examples include the Energising Development partnership programme, the Integrated Seed Sector Development programme in Ethiopia, the Integrated Seed Sector Development programme and the Integrated Seed Sector Development programme plus in Uganda, and the Ghana Climate Innovation Centre. The Netherlands stated in its NC7 that technology development and transfer form an integral part of many activities related to climate change mitigation and adaptation, and both private sector and knowledge institutes are partners in providing support.

128. During the review, the Netherlands illustrated how some of the activities enhance endogenous capacities and the roles played by the private sector and knowledge institutes. The Netherlands provided examples of support provided for the deployment and enhancement of the endogenous capacities and technologies of non-Annex I Parties. During the review, the Netherlands provided additional information on the 'success' story of a solar project and the 'failure' of a jatropha project (see issue 2 in table 19).

129. The ERT noted that the Netherlands provided a list of activities providing support for technology development and transfer. Support for technology development and transfer forms an integral part of many activities related to climate change mitigation and/or adaptation, encompassing both hardware (equipment) and software (know-how, methods and practices). Both the private sector and several knowledge institutes are partners in providing such support.

130. The Netherlands provided information, by way of a list of projects and activities, on steps taken to promote, facilitate and finance the transfer of technology to developing countries and to build their capacity in order to facilitate implementation of Article 10 of the Kyoto Protocol.

(b) Assessment of adherence to the reporting guidelines

131. The ERT assessed the information reported in the NC7 of the Netherlands and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 19.

Table 19
Findings on technology development and transfer, including information under Article 10 of the Kyoto Protocol, from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 55	Although the Netherlands provided details of supported projects involving technology transfer to developing country Parties, it did not provide any information on the impact on GHG emissions.
	Issue type: transparency	The ERT encourages the Netherlands to report, in its next NC, all elements required by table 6 of the UNFCCC reporting guidelines on NCs, including GHG emissions, for greater transparency.
	Assessment: encouragement	
2	Reporting requirement specified in paragraph 56	The Netherlands did not report in its NC7 on steps taken by the Government to support the development of the endogenous capacities and technologies of developing countries.
	Issue type: completeness	During the review, the Party provided the ERT with examples of how endogenous capacities and technologies were enhanced, and examples of projects deemed to be successes or failures.
	Assessment: recommendation	The ERT reiterates the recommendation made in the previous review report that the Netherlands provide information on its support for the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

E. Vulnerability assessment, climate change impacts and adaptation measures

1. Technical assessment of the reported information

132. In the NC7 the Netherlands provided the required information on the expected impacts of climate change in the country; the adaptation policies covering regional, sectoral and cross-sectoral vulnerabilities and considerations; and an outline of the action taken to implement Article 4, paragraph 1(b) and (e), of the Convention with regard to adaptation. The Netherlands provided a description of climate change vulnerability and impacts on sectors and highlighted the adaptation response actions taken and planned at different levels of government. The vulnerable sectors and areas were defined in the NC7 as water and spatial management; nature; agriculture, horticulture and fisheries; health and welfare; recreation and tourism; infrastructure (road, rail, water and aviation); energy; information technology and telecommunications; and public safety and security.

133. Impetus has been given to addressing adaptation matters with the adoption of the National Climate Adaptation Strategy in 2007, which was produced under the National Programme for Spatial Adaptation to Climate Change. In 2010 the Dutch Delta Programme was initiated, which focuses mainly on water management. The Programme aims to protect the Netherlands against flooding and to guarantee adequate water supply in the future. In 2017 the Delta Plan on Spatial Adaptation was presented as part of the Dutch Delta Programme to enhance the implementation of the Delta Plan on Spatial Adaptation. With the decision of the Netherlands Court of Audit, the National Climate Adaptation Strategy "Adapting with ambition" was presented in 2016 to broaden the scope of adaptation beyond the water domain, which provided further direction to government agencies on enhancing preparedness for climate change.

134. Situated in a low-lying delta area with four large rivers and with a high population density, the Netherlands is vulnerable to the impacts of climate change. The climate in the Netherlands is expected to undergo significant changes over the coming decades. The most pressing consequences are warmer and wetter winters, drier and hotter summers, more extreme river discharge, changes in biodiversity and rising sea level.

135. The Netherlands Environmental Assessment Agency has developed a methodology to define the urgency of adaptation measures by looking at the degree of uncertainty, the probability and impact of climate effects, and the adaptive capacity of the system at hand and the lifespan of the necessary investments. The resulting assessment has led to the identification of six urgent climate effects as the focus of the National Climate Adaptation Strategy, namely problems associated with heat stress; failure of vital systems; crop failures and other problems in the agriculture sector; shifting climate zones influencing flora and fauna; increases in infectious diseases and allergic conditions; and cumulative effects of system failure. Table 20 summarizes the information on vulnerability and adaptation to climate change presented in the NC7 of the Netherlands.

Table 20
Summary of information on vulnerability and adaptation to climate change reported by the Netherlands

Vulnerable area	*Examples/comments/adaptation measures reported*
Agriculture and food security	*Vulnerability*: The main effects of climate change on the agriculture sector are yield loss and economic losses because of pluvial flooding, waterlogging and drought. Drought risk is highest in the areas that have little or no access to water from rivers or ditches and in areas where the water table is low. In addition, new pests and diseases may occur and also, because of heat stress, livestock may be negatively affected. Changes in climate may also result in positive effects such as increase in crop productivity and an extension of the growing season. *Adaptation*: Farmers can adapt to high-intensity rainfall by improving drainage. Measures at the sectoral level are also required, specifically for the development of heat-resistant or pest- and disaster-resistant varieties.
Biodiversity and natural ecosystems	*Vulnerability*: As a result of warmer temperatures, some species (including pests and nuisance species) may pose a threat to biodiversity. There may be a change in the growing and the flowering periods of plants and the breeding season of birds, which may result in a disrupted food chain.

Vulnerable area	*Examples comments adaptation measures reported*
	Hydrological changes in groundwater and surface water can put direct pressure on ecosystems, such as forests, coasts and peat areas. *Adaptation*: The National Ecological Network was initiated, which is a concept intended to offset the impact of climate change by allowing more space for natural processes. Climate buffer projects have been carried out and were used to demonstrate best practices by the Delta Programme, which in turn led to further knowledge development and publicity.
Coastal zones	*Vulnerability*: In the coastal provinces, where salinization can occur, a dry year means that no water of the desired quality can be withdrawn for long periods. In coastal areas, an increase in peak discharges from the rivers in winter may raise the likelihood of flooding. Rising sea levels lead to coastal erosion and reduce safety along the coast. *Adaptation*: Sand replenishment is the key solution for coastal defences, which enables the coastal foundation zone to grow concurrently with the rise in the sea level. In addition, there is a comprehensive approach to spatial development of the coastal zone, which has been taken up seriously and which allows for a balanced development of nature, economy and accessibility in the existing coastal areas.
Fisheries	*Vulnerability*: Because of the warmer temperatures, it is expected that the yield of northern species will decrease while southern species will increase, and this could affect specialized fisheries. As a result of higher CO_2 levels, ocean acidification may lead to a population-scale impact on fish and shellfish. Moreover, there may be possible effects on the food web, such as an enhanced sensitivity of calcifying plankton and effects on fish sensory systems, which may change behavioural patterns. In freshwater systems, mortality during summer could increase. There is a higher probability of diseases, pest algae and damage from storms, especially for shellfish. Overall, the implications of climate change for fisheries are still considered to be limited. *Adaptation*: No adaptation measures planned.
Human health	*Vulnerability*: In the Netherlands, human health is vulnerable to heat stress, mental stress caused by increased pluvial flooding and flood threats; moreover, there are some indirect health consequences of climate change, such as an increase in water-related diseases, allergies (e.g. hay fever and house dust mite) and diseases related to air quality. *Adaptation*: Municipal health departments are providing various forms of support to prevent climate-related infectious diseases and exposure to allergens. They are monitoring risks in and around open water that is used for recreational purposes. In addition, they are responsible for pest control. Municipal health departments also provide advice on other allergens. Moreover, as part of the Knowledge for Climate Research Programme, a number of provincial and municipal authorities have carried out a study on the urban heat island effect, which may be controlled with proper and timely information.
Infrastructure	*Vulnerability*: The economic costs of storms and floods could be very high. Higher temperatures and precipitation may result in increased damage and deterioration. The accessibility of infrastructure could be lower because of extreme weather and that may result in higher costs for transport. The vulnerability of transport to extreme weather may also increase because of the interdependency on energy, information technology and telecommunications. *Adaptation*: The 'climate proofing' of the urban area against flooding is being improved by local measures (drainage, green roofs and water squares) and by spatial measures such as the construction of new open water (ditches, canals and ponds). The procedures for replacing essential water management structures, such as locks and dams, as well as plans for new infrastructure take into account the risks imposed by climate change.
Energy, information technology and telecommunications	*Vulnerability*: An increase in electricity consumption in summer is possible due to warmer temperatures, as is an increase in the frequency of cooling water constraints for facilities such as power plants. Dependency on the energy and information technology networks may increase the vulnerability of society. Energy sources such as solar and wind are becoming more vulnerable to climate and weather extremes. A disruption of the energy supply because of the impacts of climate change can have a direct effect on information technology. *Adaptation*: A number of projects are being carried out with private companies and network managers to devise ways to 'climate proof' vital functions.
Water resources	*Vulnerability*: Sea level has risen by 20 cm in the past 100 years and is expected to further increase This has led to coastal erosion and has reduced safety along the coast. Because of drought, an increase in water quality deterioration could coincide with decreasing water volumes, dropping water levels or higher water temperatures. Freshwater availability could be negatively affected by the increase in salt water intrusion into surface water bodies. The evaporation of water may result in an increase in nutrients in water. Extreme rainfall may result in more frequent flooding in urban

Vulnerable area	*Examples comments adaptation measures reported*
	areas. *Adaptation*: Adaptation measures are being developed related to water safety, fresh water supply in the Delta Programme and a monitoring programme to assess the strength of dykes. The cooperation on the Delta Approach to Water Quality and Fresh Water intends to improve water quality and avoid water quality problems in the future. There are some measures focusing on separating precipitation run-off from sewage water. Flood protection projects have been prioritized on the basis of data from the National Flood Risk Analysis for the Netherlands. The new standards entered into force in 2017.

136. The Netherlands provided an example related to bilateral cooperation with developing countries on adaptation, namely the Banger Polder Pilot in Semarang, Indonesia, which focuses on water and delta management. However, during the review, the Netherlands informed the ERT that other support activities for developing countries in preparing for adaptation were mentioned in the chapter of the NC7 on financial resources and technology transfer. To increase transparency, the ERT suggests that the Netherlands provide more examples of projects that include cooperation with developing countries in preparing for adaptation to the impacts of climate change in the chapter on adaptation and vulnerability. For example, the information could cover name, purpose, focus of the project in relation to specific adaptation tools, expected duration and outcomes, and progress.

137. The ERT noted that, in its NC7, the Netherlands provided climate scenarios for 2050 and 2085 by referring to 1981–2010 climate data. However, the values were not compared with the historical data for the time ranges to cover the data prior to 1981 and between 2010 and 2050 to determine the actual impacts of climate change. To improve the transparency of its reporting for future submissions, the ERT suggests that the Netherlands include comparisons for the climate scenarios for the time ranges prior to 1981 and between 2010 and 2050, if available, to determine the actual impacts of climate change scenarios in the field of vulnerability assessment and adaptation.

2. Assessment of adherence to the reporting guidelines

138. The ERT assessed the information reported in the NC7 of the Netherlands and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

F. Research and systematic observation

1. Technical assessment of the reported information

139. The Netherlands provided information on its general policy and funding relating to research and systematic observation and both domestic and international activities, including contributions to the World Climate Programme, the International Geosphere–Biosphere Programme, GCOS, the International Human Dimensions Project and the IPCC. The Netherlands' Organisation for Scientific Research and the Royal Netherlands Academy of Arts and Sciences are coordinating Dutch contributions to the international research area.

140. The Netherlands also provided information on the identification of opportunities for and barriers to the free and open international exchange of data and information and on action taken to overcome such barriers. As mentioned in the NC7, the national research programmes coordinate their communication and research activities. The research community in the Netherlands participates in several European Joint Programming Initiatives for climate, namely for food, agriculture and climate change, oceans and water. The initiatives aim to align various climate research activities in different countries.

141. The Netherlands has implemented and planned international and domestic policies and programmes on climate change research, systematic observation and climate modelling that aim to advance capabilities to predict and observe the physical, chemical, biological and human components of the Earth's system over space and time. The national research activities in the Netherlands are clustered into programmes through the Netherlands

Organisation for Scientific Research, including national research programmes on water and climate, such as Knowledge for Climate and the Delta Programme.

142. Many Dutch institutions participate in research projects under the EU Horizon 2020 Research and Innovation programme and the Copernicus Climate Change Service. The most relevant research projects and networks financed by the EU Horizon 2020 programmes in which the Netherlands contributes are the development of climate services, climate modelling, seasonal/decadal prediction, process studies and satellite services.

143. The Netherlands actively participates in various aspects of climate-related monitoring, both nationally and within European and global programmes, including atmospheric climate observation systems (including those measuring atmospheric constituents), ocean climate observation systems and terrestrial climate observation systems. Systematic observations of many climate parameters are carried out in a network of over 40 observation stations and are enhanced by special observational programmes carried out at the Cesar Observatory site (located in the western part of the Netherlands), which is also one of the selected certified stations for the GCOS reference upper-air network. Three universities and five major research institutes collaborate in Cesar, and on this site a number of activities are ongoing, including training of young scientists. The Netherlands supports seven free-drifting profiling floats within the scope of the ARGOS programme, which is a systematic oceanic observation system that provides continuous monitoring of the temperature, salinity and velocity of the upper ocean.

144. In terms of activities related to systematic observation, the Netherlands reported on national plans, programmes and support for ground- and space-based climate observing systems, including satellite and non-satellite climate observations. Monitoring activities on systematic observation and GCOS in the Netherlands are closely integrated in the international programme. However, an integrated national programme for the implementation of the Netherlands' contribution to GCOS has not yet been established, not only because of a lack of funding and resources, but also because of the lack of a national focal point. The Netherlands has also been involved in international cooperation at the individual project level, such as developing Earth and NASA missions, and data retrieval methods. Data are exchanged internationally and submitted to numerous databases around the world.

145. The NC7 reflects actions taken at the international level. The Netherlands reported in its NC7 about a number of activities, initiatives and partnerships, for example CREWS, which is working on climate analysis and data in the Indonesian region; and the joint initiative of the Royal Netherlands Meteorological Institute and the Meteorological Service of Surinam (the Paramaribo station), which is financed through a grant from the Foundation for Netherlands Scientific Research and includes a programme on ozone measurement. The Netherlands also addresses internationally oriented programmes, such as Urbanizing Deltas of the World, aiming to contribute to global water safety, water and food security, and sustainable economic development in river deltas worldwide.

146. Two other examples of international cooperation on climate change are the programme funded by the Department for International Development (of the United Kingdom of Great Britain and Northern Ireland), which is directed at the study of linkages between conflict and cooperation, with the objective of strengthening the evidence of the impact of climate change and climate change policies on conflict or cooperation in developing countries; and the Global Facility for Disaster Reduction and Recovery, which is a global partnership that helps developing countries to better understand and reduce their vulnerability to natural hazards and climate change.

2. Assessment of adherence to the reporting guidelines

147. The ERT assessed the information reported in the NC7 of the Netherlands and identified issues relating to completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. The findings are described in table 21.

Table 21
Findings on research and systematic observation from the review of the seventh national communication of the Netherlands

No.	*Reporting requirement, issue type and assessment*	*Description of the finding with recommendation or encouragement*
1	Reporting requirement specified in paragraph 58 Issue type: transparency Assessment: recommendation	The Netherlands described actions taken to support capacity-building in developing countries. The NC7 stated that activities are conducted through various international partnerships and initiatives. However, which countries are supported and the exact purpose/duration of the projects was not clear. During the review, the Netherlands provided a list of programmes and initiatives addressing the needs of developing country Parties. To increase transparency, the ERT recommends that the Netherlands include information on its actions taken to the support capacity-building in developing countries on research and systematic observation.
2	Reporting requirement specified in paragraph 63 Issue type: completeness Assessment: encouragement	The information reported in the NC7 regarding socioeconomic analysis, including analysis of both the impacts of climate change and response options, is incomplete. During the review, the Netherlands explained that no specific analyses dealing with the impact of response measures are currently available. The ERT encourages the Netherlands to report in its next NC information on socioeconomic analysis, including both the impacts of climate change and of response options.
3	Reporting requirement specified in paragraph 64 Issue type: completeness Assessment: encouragement	The NC7 provided information on conducted activities to establish and maintain observing systems, and related data and monitoring systems in developing countries. However, the NC7 did not include information on their current status. The ERT encourages the Netherlands to include in its next NC information on the status of activities to support developing countries to establish and maintain observation systems and related data and monitoring systems.

Note: Paragraph number listed under reporting requirement refers to the relevant paragraph of the UNFCCC reporting guidelines on NCs. The reporting on the requirements not included in this table is considered to be complete, transparent and adhering to the UNFCCC reporting guidelines on NCs.

G. Education, training and public awareness

1. Technical assessment of the reported information

148. In the NC7 the Netherlands provided information on its actions relating to education, training and public awareness at the domestic and international level. The Party provided information on the general policy on education, training and public awareness, primary, secondary and higher education, public information campaigns, training programmes, education materials, resource or information centres, the involvement of the public and non-governmental organizations and its participation in international activities.

149. The Dutch climate envoy (Action for Climate Empowerment national focal point) is responsible for matters related to education, training and public awareness and works closely with the Ministries of Education, Infrastructure and Water Management, and Foreign Affairs as well as with NGOs, and in particular youth.

150. The general policy of the Netherlands on education is underpinned by the concept of sustainable development. A number of ministries implement activities in education, training and public awareness within their responsibilities. Education and training are aspects of the work carried out by intermediary organizations, such as the Netherlands Enterprise Agency, Rijkswaterstaat and the NGO Milieu Centraal.

151. The intergovernmental programme Duurzaam Door, established in 2004 and funded by the Netherlands Enterprise Agency, stimulates learning about sustainable development.

The programme targets both youth and adults and finances different organizations that are active in education, training and public awareness. In 2014, youth organizations joined forces and campaigned for an increase in education on sustainable development. Together with multinational corporations, teachers unions and research institutes, the youth organizations managed to sign an agreement with a majority of Parliament to take the next step in education on sustainable development. Another project, Learning for Tomorrow, launched in 2016 by a number of existing youth networks and education networks, aims to arrange financial, knowledge and resource support.

152. As well as governmental organizations, NGOs also play an important role in education, training and public awareness. One example is the HIER (the Dutch word for 'here') climate campaign, whereby 40 organizations (mostly NGOs) work together to counter the negative effects of climate change through activities such as coordinated consumer campaigns, raising awareness, joint communication efforts and political lobbying. Another example is the work of Milieu Centraal, which works with governmental actions and has created an overview of the top *klimaatklappers* (the Dutch word for "climate action") in 2015, the activities that have the greatest impact on climate. A number of additional actions are focused on adaptation, including water. The first campaign, The Netherlands Lives with Water, started in 2003. The most recent one is the programme Our Water, launched in 2014. In addition, an information tool about flood risk was developed for households and organizations to be able to prepare themselves for the eventuality, which made available on the website of the programme Our Water.

153. Several surveys have been carried out by governmental and other organizations. As presented in the NC7, the surveys show that an important part of the population has a high awareness of climate change. According to a large survey conducted by the Government in 2016, 46 per cent of respondents think that the Netherlands should lower its use of fossil fuels more rapidly than it is now.

154. The Netherlands reported on activities related to the New Delhi work programme on Article 6 of the Convention (decision 11/CP.8). In addition, the NC7 indicated that the Netherlands provides several courses and training programmes to improve international awareness, for example the Mena Scholarship Programme for students from developing countries.

2. Assessment of adherence to the reporting guidelines

155. The ERT assessed the information reported in the NC7 of the Netherlands and recognized that the reporting is complete, transparent and adhering to the UNFCCC reporting guidelines on NCs. No issues relating to the topics discussed in this chapter of the review report were raised during the review.

III. Conclusions and recommendations

156. The ERT conducted a technical review of the information reported in the NC7 of the Netherlands in accordance with the UNFCCC reporting guidelines on NCs. The ERT concludes that the reported information mostly adheres to the UNFCCC reporting guidelines on NCs and that the NC7 provides an overview of the national climate policy of the Netherlands.

157. The information provided in the NC7 includes most of the elements of the supplementary information under Article 7 of the Kyoto Protocol, with the exception of information on supplementarity relating to the mechanisms pursuant to Articles 6, 12 and 17 of the Kyoto Protocol; PaMs in accordance with Article 2 of the Kyoto Protocol; domestic and regional programmes and/or legislative arrangements and enforcement and administrative procedures; and financial resources. Supplementary information under Article 7, paragraph 1, of the Kyoto Protocol on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol was provided by the Netherlands in its 2017 annual submission.

158. The Netherlands' total GHG emissions, excluding LULUCF and including indirect emissions, covered by its quantified economy-wide emission reduction target were estimated to be 11.8 per cent below its 1990 level, whereas total GHG emissions, including

LULUCF and including indirect CO_2 emissions, were 11.2 per cent below its 1990 level, in 2015.

159. Emission decreases were driven by CH_4, N_2O and F-gases, which have declined by 41.2, 52.9 and 69.6 per cent, respectively, since 1990, and the notable decrease in emissions from energy use in non-energy industries (by 24.9 per cent). The CH_4 emission trend was driven by the decreasing number of livestock in agriculture and by substantially falling emissions from landfill sites. N_2O emissions have decreased due mainly to the reduction in the amount of manure applied to land, the reduction in fertilizer use and measures taken in chemical industry. Those factors outweighed the effects of improvements in the efficiency of energy supply and use in the industrial sector, which are the result of measures taken under the long-term agreements on energy efficiency.

160. The Netherlands' main policy frameworks relating to energy and climate change are the 2013 Agreement on Energy for Sustainable Growth and the green deals. The key legislation supporting the Netherlands' climate change goals comprises the Environmental Management Act, the Environmental Permitting Act and the Housing Act. The mitigation actions with the most significant mitigation impact are the SDE+ subsidy scheme for renewable energy production and the PaMs for the built environment and transport.

161. The quantified economy-wide emission reduction target under the Convention is a joint target of the EU and its 28 member States to reduce emissions by 20 per cent compared with the base-year (1990) level by 2020. Under the ESD, the Netherlands has a target of reducing its emissions by 16 per cent below the 2005 level by 2020. The Netherlands reported on its progress in achieving the AEAs in 2013–2016 and the revised AEAs for 2017–2020. According to the revision, the Netherlands' AEAs (its national emission target for non-ETS sectors) change linearly from 114,050.54 kt CO_2 eq in 2017 to 107,362.86 kt CO_2 eq in 2020. The ESD projections for 2020 are below the AEA for 2020 by 11.4 and 12.3 per cent under the WEM and WAM scenarios, respectively. On the basis of the reported information, the ERT concludes that the Netherlands expects to meet its target for non-ETS sectors.

162. The GHG emission projections provided by the Netherlands include those under the WEM and WAM scenarios. In the two scenarios, emissions are projected to be 23.3 and 24.1 per cent below the 1990 level in 2020, respectively. On the basis of the reported information, the ERT concludes that the Netherlands expects to contribute to the EU 2020 target of a 20 per cent emission reduction compared with the 1990 level under the WEM and WAM scenarios.

163. The NC7 contains information on how the Party's use of the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol is supplemental to domestic action, although it did not elaborate on supplementarity as such. The Netherlands reported that it does not plan to make use of the Kyoto Protocol mechanisms to meet its Kyoto Protocol target for the second commitment period.

164. The Netherlands continued to provide climate financing to developing countries. It has reduced its contributions by 9.6 per cent since the NC6, and its public financial support in 2015 and 2016 totalled USD 567.6 and 513.0 million per year, respectively. For those years, the Netherlands' support provided for mitigation action was lower than its support provided for adaptation. The biggest share of financial support went to cross-cutting projects, followed by the energy, agriculture, forestry and water sectors. The Netherlands does not track technology development and transfer in its climate action, but technology development and transfer form an integral part of many activities related to climate change mitigation and adaptation, encompassing both hardware (equipment) and software (know-how, methods, practices). Private sector and knowledge institutes are partners in providing support.

165. The Netherlands provided comprehensive information on the continuous, diverse and extensive work on both vulnerability and adaptation, in particular on water-related issues and coastal zone management, which are given a high priority. The Delta Committee advises on water policy and spatial planning for 2100 and beyond. The Netherlands formulated a new national adaptation strategy in 2016, which covers the sectors beyond those that are water related.

166. The Netherlands is actively participating in research and systematic observation activities in the EU and internationally. The Netherlands has also carried out several national plans and programmes to support climate observing systems, including ocean and terrestrial observing systems at the national, regional and global level. The plans and programmes support extensive research activities on climate processes and climate system studies, modelling and prediction, and the impacts of climate change adaptation and mitigation.

167. The Netherlands reported on its multiple activities on education, training and public awareness, with a focus on efficient energy use and water management. The education system covers sustainable development and sustainable energy issues. With participation by a broad range of governmental institutions and NGOs, this work has led to a high level of public awareness on climate change matters.

168. In the course of the review, the ERT formulated the following recommendations for the Netherlands to improve its adherence to the UNFCCC reporting guidelines on NCs and its reporting of supplementary information under the Kyoto Protocol in its next NC:[5]

(a) To improve the completeness of its reporting by:

(i) Including information on institutional arrangements and decision-making procedures in place to coordinate activities relating to the Netherlands' participation in the mechanisms under Articles 6, 12 and 17 of the Kyoto Protocol (see issue 1 in table 7);

(ii) Providing information on how it strives to implement PaMs in such a way as to minimize the adverse effects of climate change and the impact of PaMs on international trade (see issue 3 in table 9);

(iii) Providing information on its support for the development and enhancement of the endogenous capacities and technologies of non-Annex I Parties (see issue 2 in table 19);

(iv) Including information to show how it took into account the need for adequacy and predictability in the flow of "new and additional" financial resources (see issue 3 in table 18);

(b) To improve the transparency of its reporting by:

(i) Including information on the use of credits and plans for the use of credits (even if it does not plan to use them) to meet its commitments under the second commitment period of the Kyoto Protocol (see issue 1 in table 16);

(ii) Making further efforts to ensure consistency between the inventory data and the NCs to improve the transparency of the projections section of the report (see issue 2 in table 13);

(iii) Providing more transparent and detailed information to show how it determined financial resources as "new and additional" (see issue 1 in table 18);

(iv) Providing more transparent information on the actions taken to support capacity-building on research and systematic observation in developing countries (see issue 1 in table 21).

IV. Questions of implementation

169. During the review the ERT assessed the NC7, including the supplementary information provided under Article 7, paragraph 2, of the Kyoto Protocol, and reviewed the information on the minimization of adverse impacts in accordance with Article 3, paragraph 14, of the Kyoto Protocol with regard to timeliness, completeness, transparency and adherence to the UNFCCC reporting guidelines on NCs. No questions of implementation were raised by the ERT during the review.

[5] The recommendations are given in full in the relevant sections of this report.

Annex

Documents and information used during the review

A. Reference documents

2017 GHG inventory submission of the Netherlands. Available at http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/10116.php.

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"Guidelines for review under Article 8 of the Kyoto Protocol". Annex to decision 22/CMP.1. Available at http://unfccc.int/resource/docs/2005/cmp1/eng/08a03.pdf.

"Guidelines for the technical review of information reported under the Convention related to greenhouse gas inventories, biennial reports and national communications by Parties included in Annex I to the Convention". Annex to decision 13/CP.20. Available at http://unfccc.int/resource/docs/2014/cop20/eng/10a03.pdf.

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Revisions to the guidelines for review under Article 8 of the Kyoto Protocol. Annex I to decision 4/CMP.11. Available at http://unfccc.int/resource/docs/2015/cmp11/eng/08a01.pdf.

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B. Additional information provided by the Party

Responses to questions during the review were received from Mr. Harry Vreuls (Netherlands Enterprise Agency), including additional material. The following documents[1] were provided by the Netherlands:

The European Commission. 2017. *Commission decision (EU) 2017/1471 of 10 August 2017: amending Decision 2013/162/EU to revise Member States' annual emission allocations for the period from 2017 to 2020.* Official Journal of the European Union, L 209/53 - 55.

[1] Reproduced as received from the Party.